Service Manual

LCD Monitor E2209Wf

Service Manual Versions and Revision

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1	1.0	2008-6-3	Initial Release

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Dell E2209W Service Manual

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Chapter 1- PRECAUTIONS & SAFETY NOTICES

SAFETY PRECAUTIONS

This monitor is manufactured and tested on a ground principle that a user's safety comes first. However, improper used or installation may cause damage to the monitor as well as to the user.

WARNINGS:

- This monitor should be operated only at the correct power sources indicated on the rating label on the rear cover of the monitor. If you're unsure the power supply in your residence, consult your local dealer or Power Company.
- Use only the specified power cord that comes with this monitor.
- Do not try to repair the monitor by yourself, as it contains no user-serviceable parts. This monitor should only be repaired by a qualified technician.
- Do not remove the monitor cabinet. There is high-voltage parts inside that may cause electric shock to human bodies.
- Stop using the monitor if the cabinet is damaged. Have it checked by a service technician.
- Put your monitor only in a lean, cool, dry environment. If it gets wet, unplug the power cable immediately and consult your closed dealer.
- Always unplug the monitor before cleaning it. Clean the cabinet with a clean, dry cloth. Apply non-ammonia based cleaner onto the cloth, not directly onto the class screen.
- Do not place heavy objects on the monitor or power cord.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety visual inspections and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Before replacing any of these components read the parts list in this manual carefully. The use of substitute replacement parts, which do not have the same safety characteristics as specified in the parts list, may create shock, fire, or other hazards.

SERVICE NOTES

- When replacing parts on circuit boards, clamp the solder wires around terminals before soldering.
- Keep wires away from high voltage, high temperature components and sharp edges.
- Keep wires in their original position so as to reduce interference.
- Adjustment of this product please refers to the user' manual.
- Use Pb free solder wire for circuit board preparation.

Chapter 2- SERVICE TOOLS & EQUIPMENT REQUIRED

1. SIGNAL GENERATOR
2. MULTIMETER
3. SCREW DRIVER
4. OSCILLOSCOPE
5. Soldering IRON
6. SOLDER (Lead free, RoHS compliance)
7. Color Analyzer
8. Fox_VISP_Programmer
9. Fox_VEDID_Programmer

Chapter 3- CIRCUIT THEORY

Block Diagram

There are 3pcs PCBA in this monitor, one is power& inverter&Audio board which is a single layer board, one is interface board including USB HUB 1up/2down, one is keypad which is OSD control, and one is USB transfer board located on the right side back cover. The system function block diagram as below This PWA is included switching power supplier, inverter for CCFL and interface board.(fig.1)

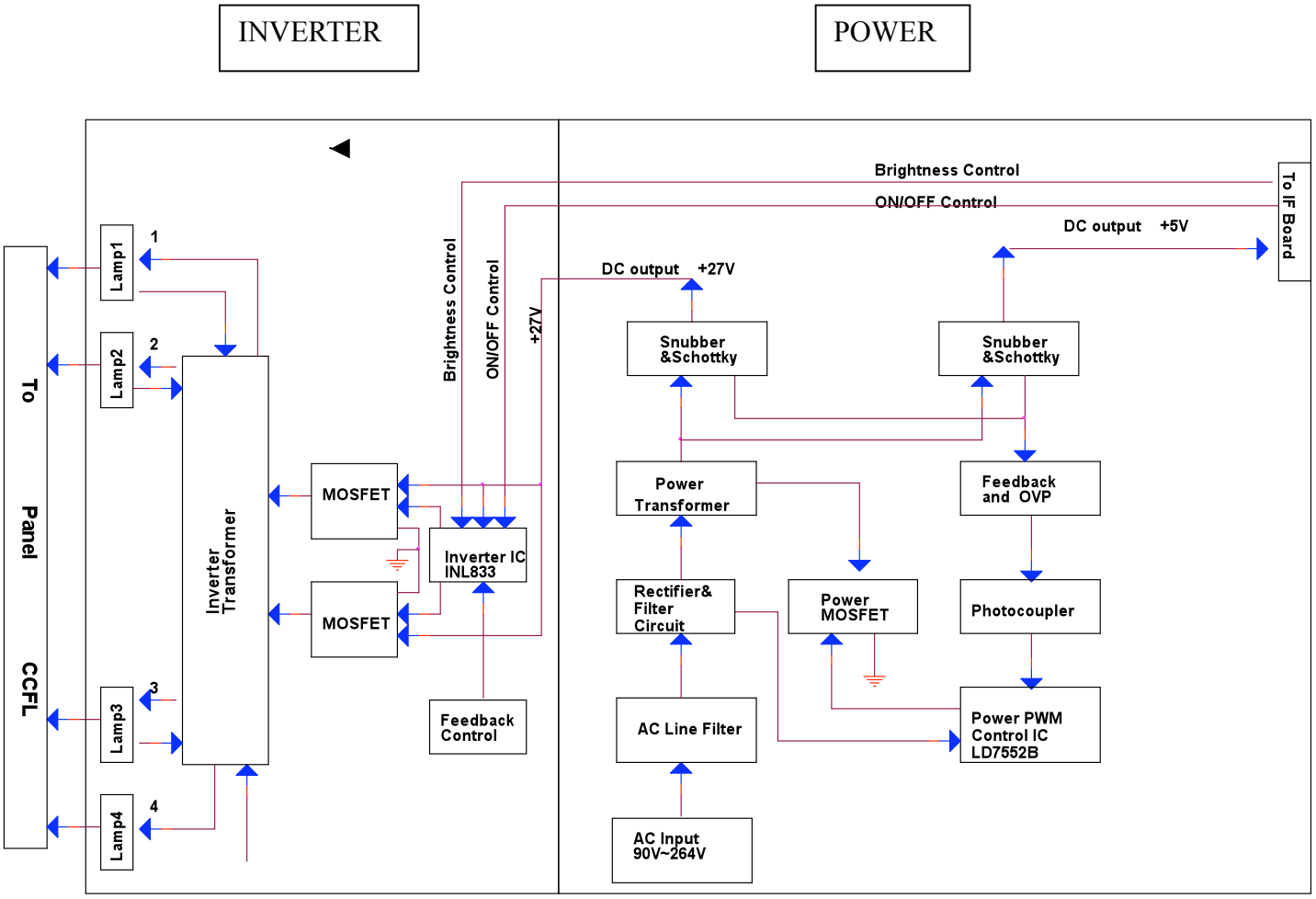


Fig.1

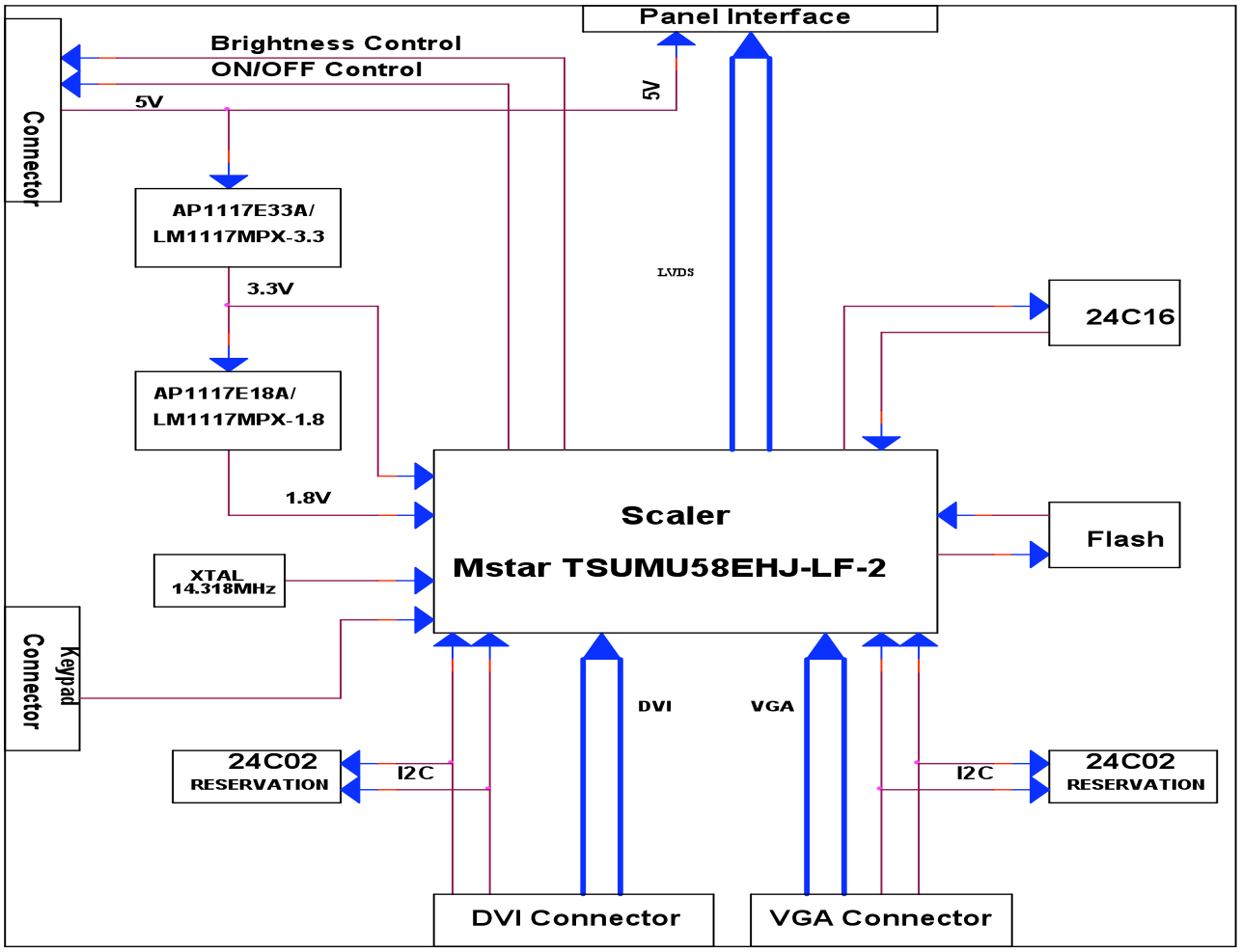

Panel Interface
Brightness Control
ON/OFF Control
5V
5V
Connector
AP1117E33A/
LM1117MPX-3.3
3.3V
LVDS
24C16
AP1117E18A/
LM1117MPX-1.8
1.8V
Scaler
Mstar TSUMU58EHJ-LF-2
Flash
XTAL
14.318MHz
Keypad
Connector
DVI
VGA
24C02
RESERVATION
I2C
I2C
24C02
RESERVATION
DVI Connector
VGA Connector

Fig.12

Electronic Circuit Theory

2.1 Inverter PWM circuit

2.1.1)Inverter Control circuit:(fig.2)

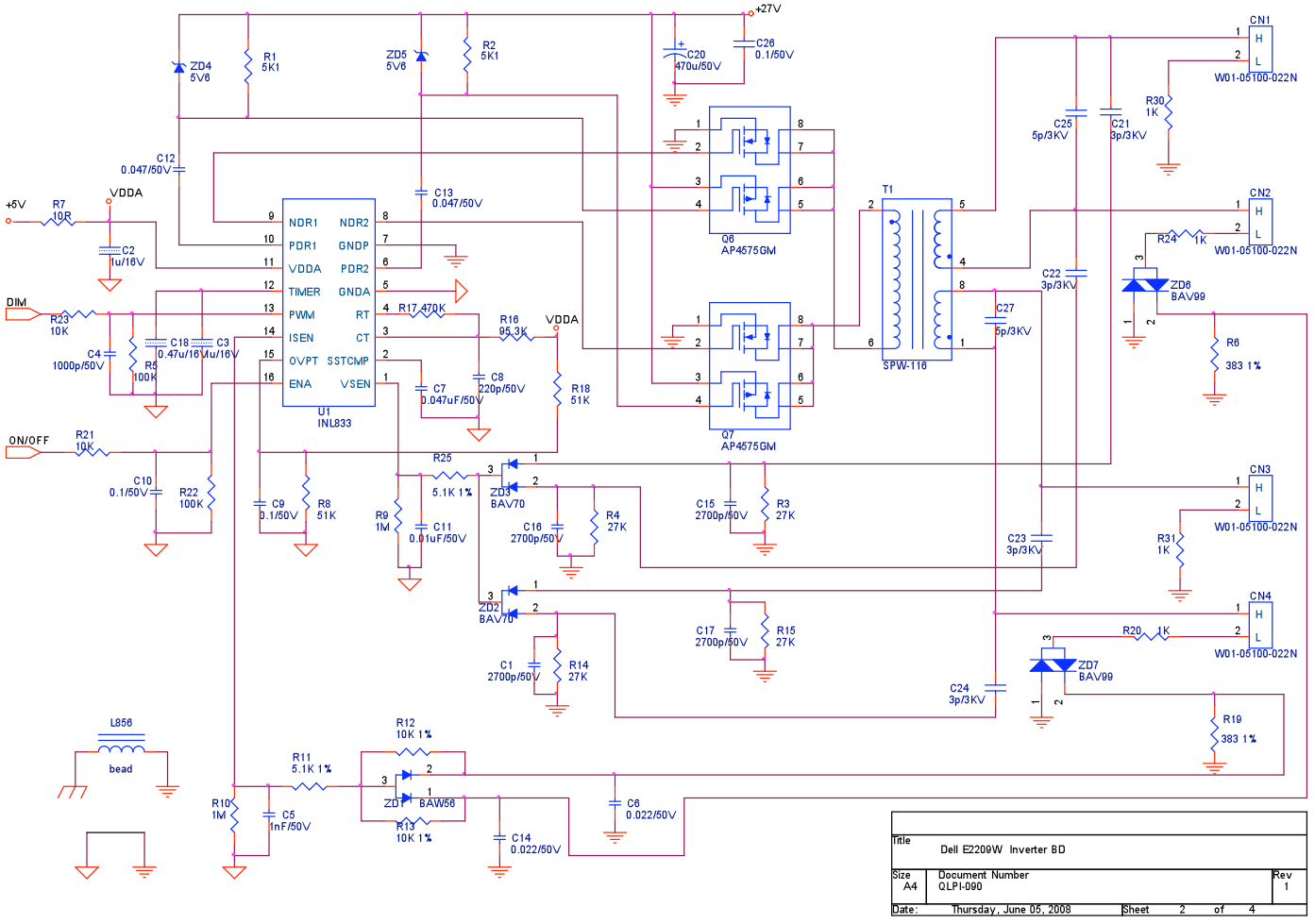


Fig.2

27VDC provides the power for U1; the control signals Brightness and ON/OFF come from I/F board. ON/OFF signal connect to pin16 of U1 and makes U1 enable. Brightness signal connect to pin12 of U1 and regulates the panel brightness, make up a network of delaying time circuit and R23 make up a divided voltage network, C3 is used to control start-up timing. The operation frequency is determined by the external Resistor R16 and capacitor C8 connected to pin3 of U1. C7 is used for soft start and compensation.

The output drives, include DRV1, DRV2 (pins8,9 respectively) output square pulses to drive MOSFET Q6, Q7 and each of Q6, Q7 is consist of a N+P channel MOSFET. Q6 and Q7 work as All Bridge structure, it is high efficient, PWM switching.

During start up, VSEN (pin1) senses the voltage at the transformer secondary. When VSEN reaches 3.0V, the output voltage is regulated. If no current is sensed approximately 2seconds U1 shut off.

The current flowing through CCFL is sensed and regulated through sense resistor R6, R19. The feedback voltage connected to Pin1 (ISEN), then compared with a reference voltage (1.5V) via a current amplifier, resulting in PWM drive outputs to All Bridge switches.

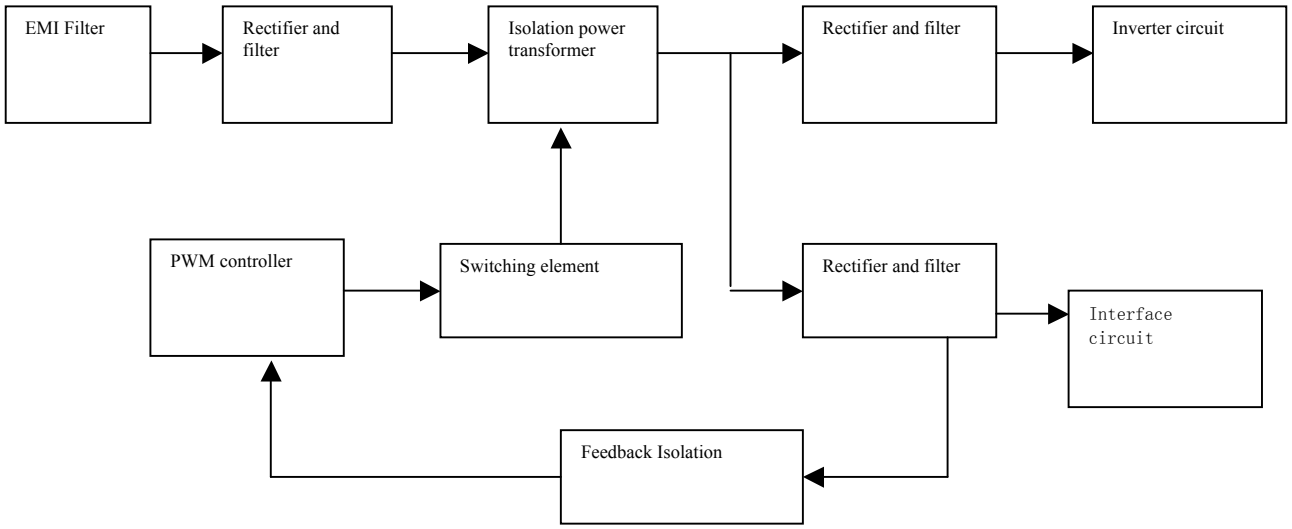
2.1.2） Protection Circuit

Over Voltage Protection and over-current protection are monitored by the voltage on VSEN(Pin 1) During normal operation , if a CCFL is damaged or removed ,the voltage at VSEN (Pin1) increases .Once the voltage at VSEN exceeds 3.0V (OVPT Setting) the driver output duty cycle is regulated and the shutdown delay timer is activated. OVPT set the overall protection threshold voltage that is lower than 3V (VSEN threshold). Once the voltage at TIMER pin reached about 3v ,the IC will shut down and latch . R3, R4,R14,R15,C1,C15,C16,C17 are connected in high voltage output connector, the divided AC voltage is inverted DC voltage through D2, D3, R9 and C11 are used to rectify wave & dump noise. Then the voltage signal reaches Pin1 VSEN of U1, when the voltage changes, build-in PWM of U1 will adjust output voltage.

Open Lamp Protection: In normal operation, R10,R11 are sensed a high level DC voltage,If a CCFL is removed or damaged during normal ,the voltage at SSTCMP(Pin2) rises rapidly .when the voltage at SSTCMP reaches a threshold of approximately 2.0V,a current source charges the capacitor(C3 and C18)connected to TIMER(Pin12).Once the voltage level at the TIMER pin reaches a threshold of approximately 3.3v,The drive outputs shut down and latch .

2.2 Power PWM circuit

2.2.1) Block diagram:(fig.4)



2.2.2) AC Input and EMI Filter:(fig.5)

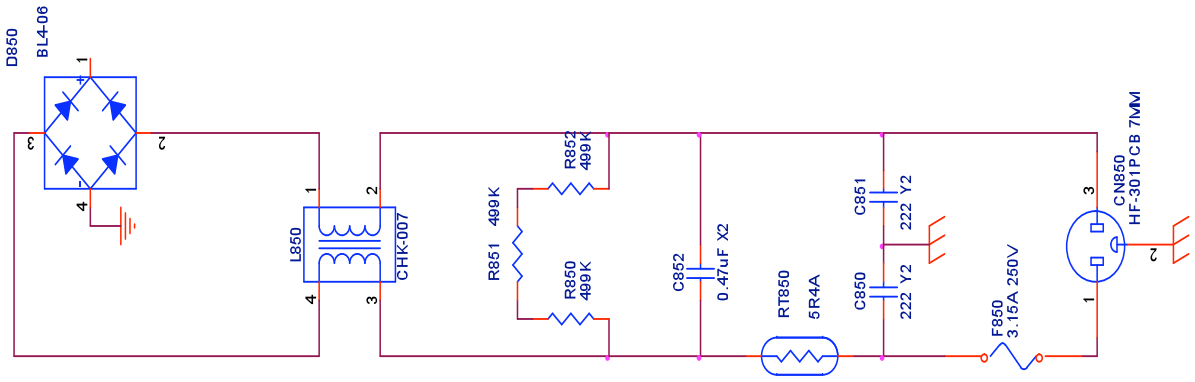


fig.5

CN850 is a connector for connecting AC Power. F850 is a fuse to protect all the circuit AC. Input

voltage is from 90V to 264V. R850/R851/R852 are joined between two inputting main circuit to prevent man from shock. L850 is used to filter low frequency noise. C850 and C851 are used to discharge the noise that L850 produced. High frequency waves are damped by C852;

2.2.3)High Voltage to Low Voltage Control Circuit:(fig.6)

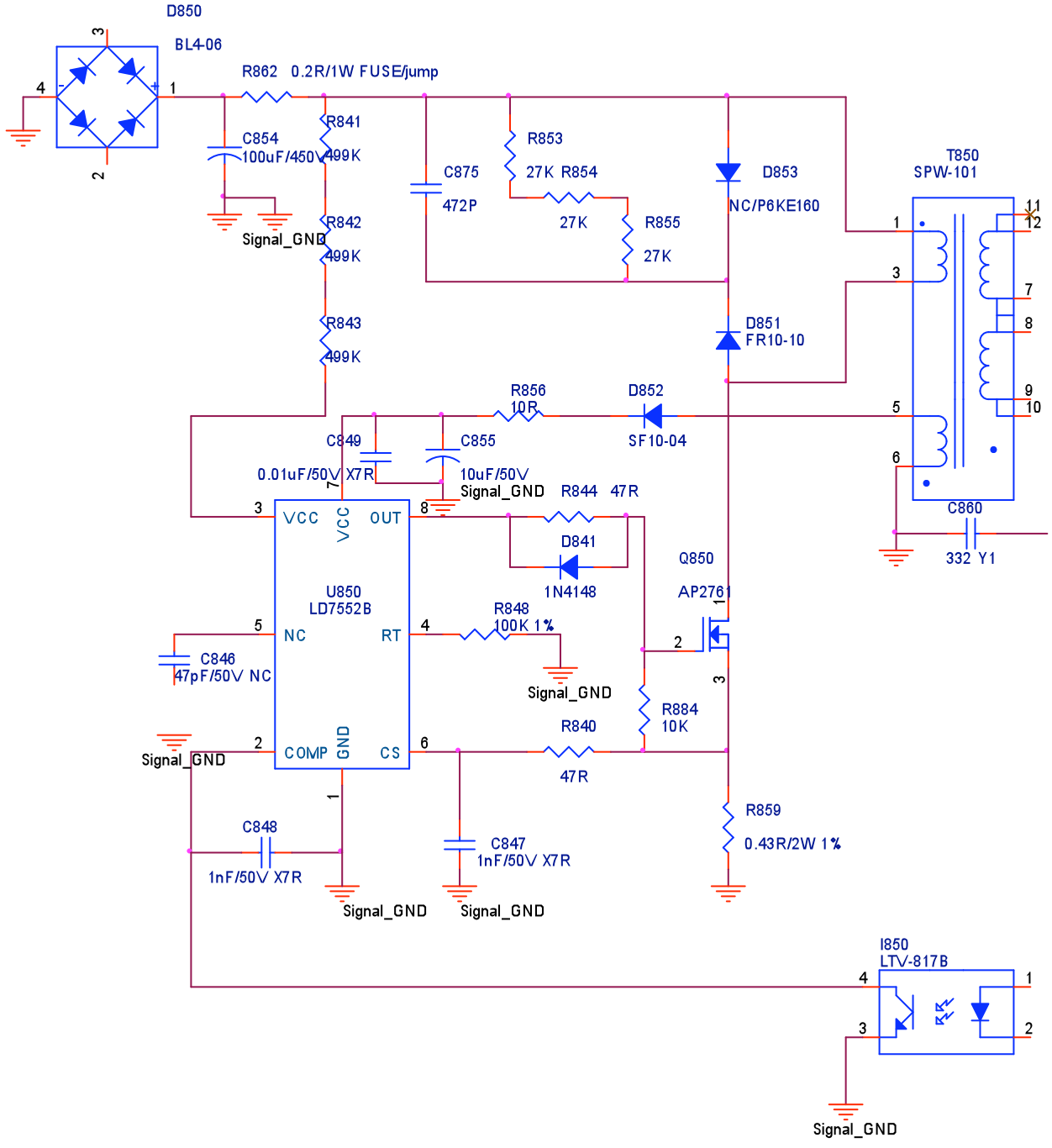


fig.6

D850 is a rectifier in which there are 4 build-in diodes, inverting AC to DC.

C854 is used to smooth the wave from rectifier. U850 is a highly integrated PWM controller. Typical start-up current for U850 is only 20 uA, When current flow through R841/R842/R843 gets to Pin 3of U850, with VDD hold-up capacitor C855, U850 is enough for starting up.

When U850 begins to operate Pin8 of U850 will output square wave to drive Q850, then the main current flow get to GND bypassing through T850, Q850. Because of the change of current flow, wires in the other side of T850 will induct current. In the same time, the current inducted by wires which connected T850 Pin 1 and Pin 3, with components of D852, R856and C855 ,will be supplied to U850 for normal operating.

When the sense voltage across the sense resistor R859, reaches the threshold voltage around 0.85v, the output GATE drive will be turned off. Every time when the output of power supply is shorted or over loaded, the FB voltage will increase, the build-in PWM output will then be turned off. Both of two will prevent the power supply from being overheated under over loading condition. The PWM duty cycle is determined by this current sense signal and VFB, the feedback voltage, when the voltage on sense pin reaches V-(PWMcopm) =(Vcomp-2VF)/3, A switch cycle will be terminated immediately, Vcomp is internally clamped to a variable voltage around 0. 85 V for output power limit

When Q850 are turned off, the main current flow will be consumed through D851, C875, R853/R854/R855 and D853, This will prevent Q850 from being damaged under large current impulse and voltage spike.

2.2.4)DC 27V and 5V Output Circuit and Feedback circuit:(fig.7)

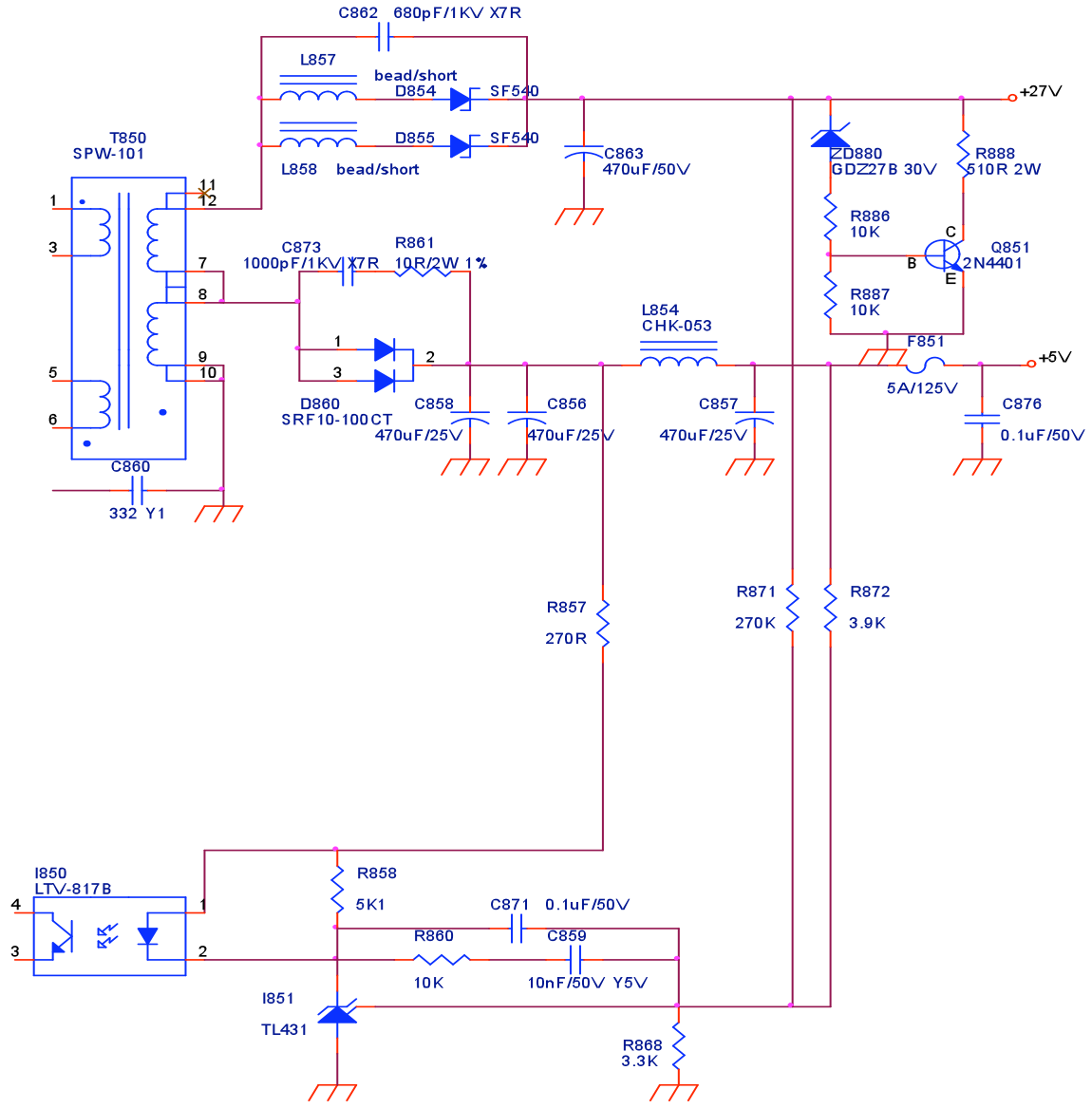


fig.7

D854/D855 is used to rectify the inducted current. C862 is used to store energy when current is reversed. The parts including C863 are used to smooth the current waves that are from D854/D855, then 27V voltage is supplied;

D860 is used to rectify the inducted current. R861 and C873 are used to store energy when current is reversed. The parts including C866, C867, C868, and L854 are used to smooth the current waves that are from D860, then 5Vvoltage is supplied;

27V and 5V supply voltage feed back to PWM controller U850 via R871, R872, R868 and I850,I851.R860,C859 and C871 used to control respond time.

2.3 I/F Board Circuit (see the Attachment 2- Schematic)

2.3.1 RGB CAPTURE

- Signal RED,GREEN,BLUE input through CN102 #1,#2,#3, Stop DC via C113, C114 and C115, and then enter into U105 (TSUMU58EHJ-LF-2) analog input PIN #28,#25,#23, and then TSUMU58EHJ-LF-2 deals with signal internally. D103, D104, D105 are ESD protector to prevent U105 from ESD.
- Signal DDC_SCL (series clock) inputs via CN102#15, and then passes through ZD106 for ESD protection, goes into EDID EEPROM IC U103 #6.
- Signal DDC_SDA (series data) inputs via CN102#12, and then passes through ZD103 for ESD protection, goes into EDID EEPROM IC U103 #5.
- Signal TTL vertical sync. (Vsync) inputs via CN102 #14, and then clamped by ZD105 Zener, passes through R134, and then goes into IC U105 (TSUMU58EHJ-LF-2) #33.
- Signal TTL horizontal sync. (Hsync) inputs via CN101 #13, and then clamped by ZD102 Zener, passes through R133, and then goes into IC U105 (TSUMU58EHJ-LF-2) #32.
- CN101#5 is defined as cable detect pin, this detector realize via R121 and U104#36, and D102 is ESD protector.
- U103 +5V is supplied by PC via CN102#9 with ZD102 for ESD protection, or supplied by Monitor self via D106
- U103 is an EEPROM IC which is memory and EDID data saved in it.

2.3.2 DVI CAPTURE

- Differential Signal input RX0+,RX0-,RX1+,RX1-,RX2+,RX2-,RXC+,RXC- through CN201 #18,#17,#10,#9,#2,#1,#23,#24 via R206,R205,R204,R203,R202,R201,R207,R208 enter into U105 (TSUMU58EHJ-LF-2) Digital input terminal #16,#15,#13,#12,#10,#9,#18,#19, and then TSUMU58EHJ-LF-2 deals with signal internally. D206, D207, D204, D205, D202, D203, D208, D209 are ESD protector to prevent U105 from ESD
- Signal DDC_SCL (series clock) inputs via CN201#6, and then passes through ZD204 Zener for ESD protection, via R209, goes into EDID EEPROM IC U201 #6.
- Signal DDC_SDA (series data) inputs via CN201#7, and then passes through ZD203 Zener for ESD protection, via R210, goes into EDID EEPROM IC U201 #5.
- CN201#15 is defined as cable detect pin, this detector realize passes through R216 ,go into U105#49, and D210 is ESD protector.
- U201 +5V is supplied by PC via CN201#14 through D201, or supplied by Monitor self via D201.
- U201 is an EEPROM IC which is memory and DVI input EDID data saved in it.

2.3.3 Buttons Control

- Button “Power” on front bezel connects to U105 (TSUMU58EHJ-LF-2) #4 through CN104 #8, U105 #4 is defined as power on/off.
- Button “+” on front bezel connects to U105 (TSUMU58EHJ-LF-2) #120 through CN104 #2, U105#120 Voltage is defined as “Plus”.
- Button “-” on front bezel connects to U105 (TSUMU58EHJ-LF-2) #121 through CN104 #3, U105 #121 Voltage is defined as “Minus”.
- Button “Menu” on front bezel connects to U105 (TSUMU58EHJ-LF-2) #50 through CN104 #1, U105 #50 Voltage is defined as “Menu”.
- Button “SELECT” on front bezel connects to U105 (TSUMU58EHJ-LF-2) #122 through CN104 #4, U105 #122 Voltage is defined as “SELECT”.
- LED Indicator on Front Bezel
  a. When press button “power”, U105 (TSUMU58EHJ-LF-2) #123 be send in low Voltage, make Q107#3 sends out high Voltage , and then to CN01#5 on keypad, LED green on.
  b. When in “Suspend” mode, U105 (TSUMU58EHJ-LF-2) #124 sends out a low Voltage, make Q108#3 sends out high Voltage and then to CN01 #7 on keypad, LED Amber ON.

2.3.4 MATAR CHIP U105 (TSUMU58EHJ-LF-2)

- U105 (TSUMU58EHJ-LF-2) #91~#100 output 8 bit even and #77~#86 output 8 bit odd LVDS digital data to panel control circuit through CN103.

- U105 (TSUMU58EHJ-LF-2) #73 output PPWR ”H” potential to make Q104 conducted, and then make Q101 conducted, +5V flow to CN103#1~#3 as Panel Vdd .
- U105 (TSUMU58EHJ-LF-2) #109 output CCFL_ON/OFF ”L” potential to control Inverter on/off.
- U105 (TSUMU58EHJ-LF-2) #125 outputs Brightness “PWM” signals to control CCFL brightness.
- TCLK by Crystal 14.318MHz input to U105 (TSUMU58EHJ-LF-2) #128/#127.
- U105 (TSUMU58EHJ-LF-2)#108 is RESET signals input pin

Please refer to U105 (TSUMU58EHJ-LF-2) Pin Assignments table in page

2.3.5 Regulator Circuit

- +3.3V is generated from Regulator U101 which is supplied by+5V via R101 and through C104 filtering,
-+1.8V is generated from Regulator U102 which is supplied by+3.3V through C106 filtering,

3. FACTORY PRESET TIMING TABLE

Standard	Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)
VESA	720 x 400	31.469	70.087
	640 x 480	31.469	59.940
	640 x 480	37.500	75.000
	800 x 600	37.879	60.317
	800 x 600	46.875	75.000
	1024 x 768	48.363	60.004
	1024 x 768	60.023	75.029
	1152 x 864	67.500	75.000
	1280 x 1024	64.000	60.000
	1280 x 1024	79.976	75.025
	1680 x 1050	65.160	60.0
IBM DOS	720 x 400	31.469	70.087

4. Power On/Off Sequency

Hardware power On/Off

When power cord plug into AC socket, Power provides 26V and DC_5V.

DC_5V is main voltage for panel and Regulator U101.

DC_3.3V is coming from Regulator U101, DC_3.3v is main voltage for U105. When DC_3.3V input to U105 and U105 reset circuit active, U105 all registers will be set to default, that means finish hardware power on.

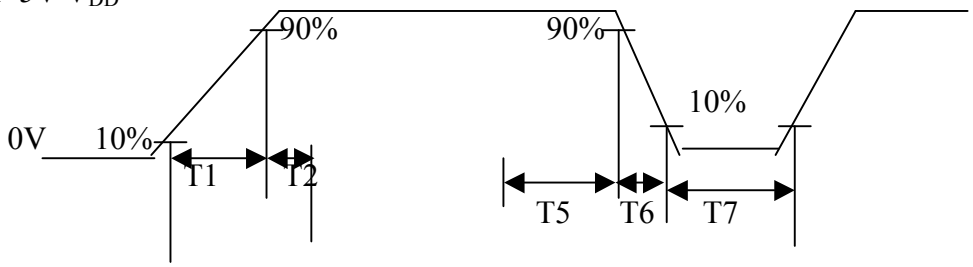
When pull out power cord from AC socket,the system shut down instantly for no supply

Software power On/Off

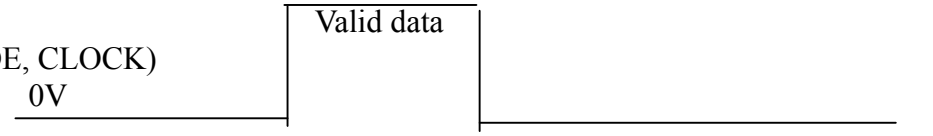
- When press power key, U105 #4 receives low pulse, then U105 (TSUMU58EHJ-LF-2) will be wake up and send control signals(at 73,109pin) to on CCFL and switch 5.0v to panel module, at the same time,U105 make the VGA/DVI cable input signal source display normal on panel if the VGA/DVI cable input signal is active
- If power ON, U105 #123 (LED_blue) will send out low potential, and then LED blue on.
- If power saveing, U105 #124 (LED_Amber) will send out low potential, and then LED Amber on.
- If power ON or power saveing, when press power key, U105 #4 receives low pulse, then U105 will be sleeping and turn off backlight, at the same time, the panel will lose +5V.

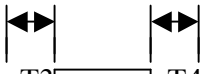
The Panel_Vcc, Backlight_En, CLK/DATA output to panel will follow the following sequency.

Power supply for panel+5V V_{DD}



Signals
(Digital RGB, HS, VS, DE, CLOCK)

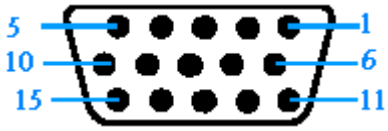




Power supply for backlight

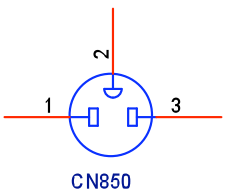
	T1(ms)	T2 (ms)	T3 (ms)	T4 (ms)	T5 (ms)	T6 (ms)	T7(ms)
SPEC(Samsung)	0.3~10	0.0~50	>500	>100	0.0~50	NA	>1000
SPEC (INL)	0.1~10	0.0~50	>200	>100	0.0~50	>0.1	>1000

5. D-SUB Connector Pin Assignment



Pin	Symbol	Pin	Symbol	Pin	Symbol
1	Red	6	Red_GND	11	GND
2	Green	7	Green_GND	12	DDC_SDA
3	Blue	8	Blue_GND	13	Hsync
4	GND	9	PC+5V	14	Vsync
5	Cable Detect	10	GND	15	DDC_SCL

6. AC Outlet Pin Assignment



Pin	Symbol
1	Line
2	GND
3	Neutral

7. Inner Connector Pin Assignment

7.1 CN103 (Connect M/B to Panel,)

Pin	Symbol	Description
1	Panel_Vcc	Panel power supply (typ.5.0V)
2	Panel_Vcc	Panel power supply (typ. 5.0V)
3	Panel_Vcc	Panel power supply (typ. 5.0V)
4	NC	
5	NC	
6	NC	

7	GND_LVDS	LVDS Ground
8	RXE3+	LVDS signal of even channel 3(-)
9	RXE3-	LVDS signal of even channel 3(+)
10	RXEC+	LVDS signal of even channel clock (+)
11	RXEC-	LVDS signal of even channel clock (-)
12	RXE2+	LVDS signal of even channel 2(+)
13	RXE2-	LVDS signal of even channel 2(-)
14	GND_LVDS	LVDS Ground
15	RXE1+	LVDS signal of even channel 1(+)
16	RXE1-	LVDS signal of even channel 1(-)
17	GND_LVDS	LVDS Ground
18	RXE0+	LVDS signal of odd channel 0(+)
19	RXE0-	LVDS signal of odd channel 0(-)
20	RXO3+	LVDS signal of odd channel 3(+)
21	RXO3-	LVDS signal of odd channel 3(-)
22	RXOC+	LVDS signal of even channel clock (+)
23	RXOC-	LVDS signal of even channel clock (-)
24	GND_LVDS	LVDS Ground
25	RXO2+	LVDS signal of even channel 2(+)
26	RXO2-	LVDS signal of even channel 2(-)
27	RXO1+	LVDS signal of even channel 1(+)
28	RXO1-	LVDS signal of even channel 1(-)
29	RXO0+	LVDS signal of odd channel 0(+)
30	RXO0-	LVDS signal of odd channel 0(-)

7.2 CN1, CN2, CN3, CN4 (Connect to Panel Backlight,)

Pin	Symbol	Description
1	HV	High voltage for lamp
2	LV	Low voltage for lamp

7.3 CN104 (Connect to keypad, WAFER2*4P or compatible connector)

Pin	Symbol	Description
1	MENU	OSD “MENU” control
2	PLUS	OSD “+” control and “Brightness/Contrast” adjustable hot key
3	MINUS	OSD “-” control and “Auto adjust” adjustable hot key
4	SELECT	OSD “input source Select” control
5	LED Blue	LED Blue on/off control
6	GND	Ground
7	LED Amber	LED amber on/off control
8	POWER	Ground

8. Key Parts Pin Assignments

U105(TSUMU58EHJ-LF-2)

Analog Interface

Pin Name	Pin Type	Function	Pin
HSYNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog HSYNC Input	32
VSYNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input	33
REFP		Internal ADC Top De-Coupling Pin	31
REFM		Internal ADC Bottom De-Coupling Pin	30
RIN0P	Analog Input	Analog Red Input	28
RIN0M	Analog Input	Reference Ground for Analog Red Input	27
SOGIN0	Analog Input	Sync-On-Green Input	26
GIN0P	Analog Input	Analog Green Input	25
GIN0M	Analog Input	Reference Ground for Analog Green Input	24
BIN0P	Analog Input	Analog Blue Input	23
BIN0M	Analog Input	Reference Ground for Analog Blue Input	22
REXT		External Resistor 390 ohm to AVDD_33	7

DVI Interface

Pin Name	Pin Type	Function	Pin
RX0N	DVI Input	Negative DVI Input for Data Channel 0	16
RX0P	DVI Input	Positive DVI Input for Data Channel 0	15
RX1N	DVI Input	Negative DVI Input for Data Channel 1	13
RX1P	DVI Input	Positive DVI Input for Data Channel 1	12
RX2N	DVI Input	Negative DVI Input for Data Channel 2	10
RX2P	DVI Input	Positive DVI Input for Data Channel 2	9
RXCKN	DVI Input	Negative DVI Input for Clock Channel	19
RXCKP	DVI Input	Positive DVI Input for Clock Channel	18

Serial Flash Interface

Pin Name	Pin Type	Function	Pin
SDO	Input w/ 5V-tolerant	SPI Flash Serial Data Output	41
CSZ	Output	SPI Flash Chip Select	42
SCK	Output	SPI Flash Serial Clock	43
SDI	Output	SPI Flash Serial Data Input	44

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LVDS Interface

Pin Name	Pin Type	Function	Pin
LVA0M	Output	LVDS A-Link Channel 0 Negative Data Output	86
LVA0P	Output	LVDS A-Link Channel 0 Positive Data Output	85
LVA1M	Output	LVDS A-Link Channel 1 Negative Data Output	84
LVA1P	Output	LVDS A-Link Channel 1 Positive Data Output	83
LVA2M	Output	LVDS A-Link Channel 2 Negative Data Output	82
LVA2P	Output	LVDS A-Link Channel 2 Positive Data Output	81
LVA3M	Output	LVDS A-Link Channel 3 Negative Data Output	78
LVA3P	Output	LVDS A-Link Channel 3 Positive Data Output	77
LVACKM	Output	LVDS A-Link Negative Clock Output	80
LVACKP	Output	LVDS A-Link Positive Clock Output	79
LVB0M	Output	LVDS B-Link Channel 0 Negative Data Output	100
LVB0P	Output	LVDS B-Link Channel 0 Positive Data Output	99
LVB1M	Output	LVDS B-Link Channel 1 Negative Data Output	98
LVB1P	Output	LVDS B-Link Channel 1 Positive Data Output	97
LVB2M	Output	LVDS B-Link Channel 2 Negative Data Output	96
LVB2P	Output	LVDS B-Link Channel 2 Positive Data Output	95
LVB3M	Output	LVDS B-Link Channel 3 Negative Data Output	92
LVB3P	Output	LVDS B-Link Channel 3 Positive Data Output	91
LVBCKM	Output	LVDS B-Link Negative Clock Output	94
LVBCKP	Output	LVDS B-Link Positive Clock Output	93

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GPIO Interface

Pin Name	Pin Type	Function	Pin
GPIO_P14 / PWM0	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	2
GPIO_P15	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength	3
GPIO_P16	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength	4
GPIO_P22 / PWM1	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	36
GPIO_P47-GPIO_P43	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength	45-49
GPIO_P42	Input/Output	General Purpose Input/Output; 4mA driving strength	50
GPIO_P24 / PWM2	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	51

Pin Name	Pin Type	Function	Pin
GPIO_00-GPIO_02	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength	55-57
GPIO_06	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength	70
GPIO_P04 / PWM3	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	73
GPO_P42	Output	General Purpose Output; 4mA driving strength	75
GPO_P43	Output	General Purpose Output; 4mA driving strength	76
GPIO_P25 / PWM3	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	109
GPIO_P26 / PWM0	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	110
GPIO_P27 / PWM1	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	111
GPIO_07-GPIO_10	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength	115-118
GPIO_P00 / SAR0	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength / SAR ADC Input	119
GPIO_P01 / SAR1	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength / SAR ADC Input	120
GPIO_P02 / SAR2	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength / SAR ADC Input	121
GPIO_P03 / SAR3	I/O w/ 5V-tolerant	General Purpose Input/Output; 4mA driving strength / SAR ADC Input	122
GPIO_P06	I/O w/ 5V-tolerant	General Purpose Input/Output; 6/12mA programmable driving strength	123
GPIO_P07	I/O w/ 5V-tolerant	General Purpose Input/Output; 6/12mA programmable driving strength	124
GPIO_P13 / PWM2	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	125

Misc. Interface

Pin Name	Pin Type	Function	Pin
BYPASS		For External Bypass Capacitor	102
VCTRL	Output	Regulator Control	103
RST	Input w/ 5V-tolerant	Chip Reset; High Reset	108
MODE	Input	Chip Configuration Input; 10K ohm pull-low for normal operation	37

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Pin Name	Pin Type	Function	Pin
DDCD_SDA	I/O w/ 5V-tolerant	DDC Data and HDCP Slave Serial Port Data for DVI Interface; 4mA driving strength	5
DDCD_SCL	Input w/ 5V-tolerant	DDC Clock and HDCP Slave Serial Port Clock for DVI Interface	6
DDCA_SDA / RS232_TX	I/O w/ 5V-tolerant	DDC Data for Analog Interface / UART Transmitter / General Purpose Input/Output; 4mA driving strength	34
DDCA_SCL / RS232_RX	I/O w/ 5V-tolerant	DDC Clock for Analog Interface / UART Receiver / General Purpose Input/Output; 4mA driving strength	35
I2C_MDA / GPIO_P11	I/O w/ 5V-tolerant	I2C Master Data / General Purpose Input/Output; 4mA driving strength	38
I2C_MCL / GPIO_P10	I/O w/ 5V-tolerant	I2C Master Clock / General Purpose Input/Output; 4mA driving strength	39
XIN	Crystal Oscillator Input	Xin	128
XOUT	Crystal Oscillator Output	Xout	127

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Power Pins

Pin Name	Pin Type	Function	Pin
AVDD_33	3.3V Power	Analog Power	34, 44, 50, 52, 60
VDDP	3.3V Power	Digital Output Power	14, 67, 95, 103, 115
VDDC	1.8V Power	Digital Core Power	12, 68, 97, 117
GND	Ground	Ground	13, 38, 41, 47, 96, 116

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No Connects

Pin Name	Pin Type	Function	Pin
NC		No connects	1-3, 5-10, 15-18, 80-94, 98-101, 128

for Innolux

8.1 U108 (Serial Flash)

Pin	Symbol	I/O	Description
1	CE#	I	The device is enabled by a high to low transition on CE#. CE# must remain low for the duration of any command sequence.
2	SO	I/O	To transfer commands, addresses, or data serially into the device.
3	WP#	I/O	The write protect (WP#) pin is used to enable/disable BPL bit in the status register.
4	VSS	G	Connect ground
5	SI	I/O	To transfer commands, addresses, or data serially into the device input are latched on the rising edge of the serial clock.
6	SCK	I/O	To provide the timing of serial interface. Commands, addresses, or input data are latched on the rising edge of the clock input, while output data is shifted out on the Falling edge of the clock input.
7	HOLD	I/O	To temporarily stop serial communication with SPI flash memory without resetting the device.
8	VDD	P	To provide power supply.

8.3 U850 (LD7552B, PWM Power Controller)

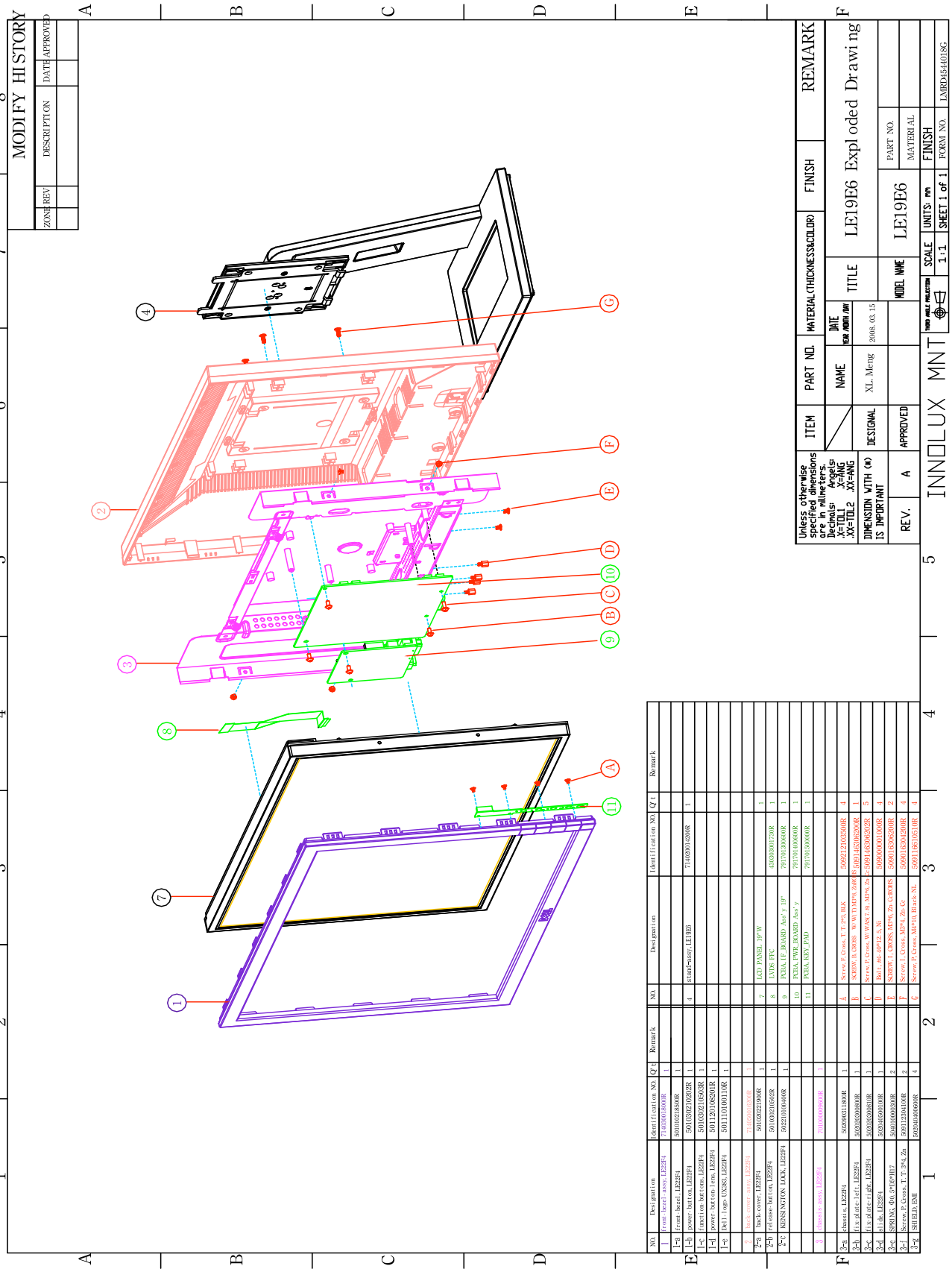
Pin	Symbol	I/O	Description
1	GND		Ground
2	COMP	I	Voltage feedback pin(same as the COMP pin in UC384X).By connecting a photo-coupler to close the control loop and achieve the regulation.
3	VCC	I	Supply voltage pin
4	RT	I	This pin is to program the switching frequency. By connecting a resistor to ground to set the switching frequency.
5	NC		Unconnected pin
6	CS	I	Unconnected pin
7	VCC	I	Supply voltage pin
8	OUT	O	Gate drive output to drive the external MOSFET

8.4 U1 (INL833, CCFL Inverter controller IC)

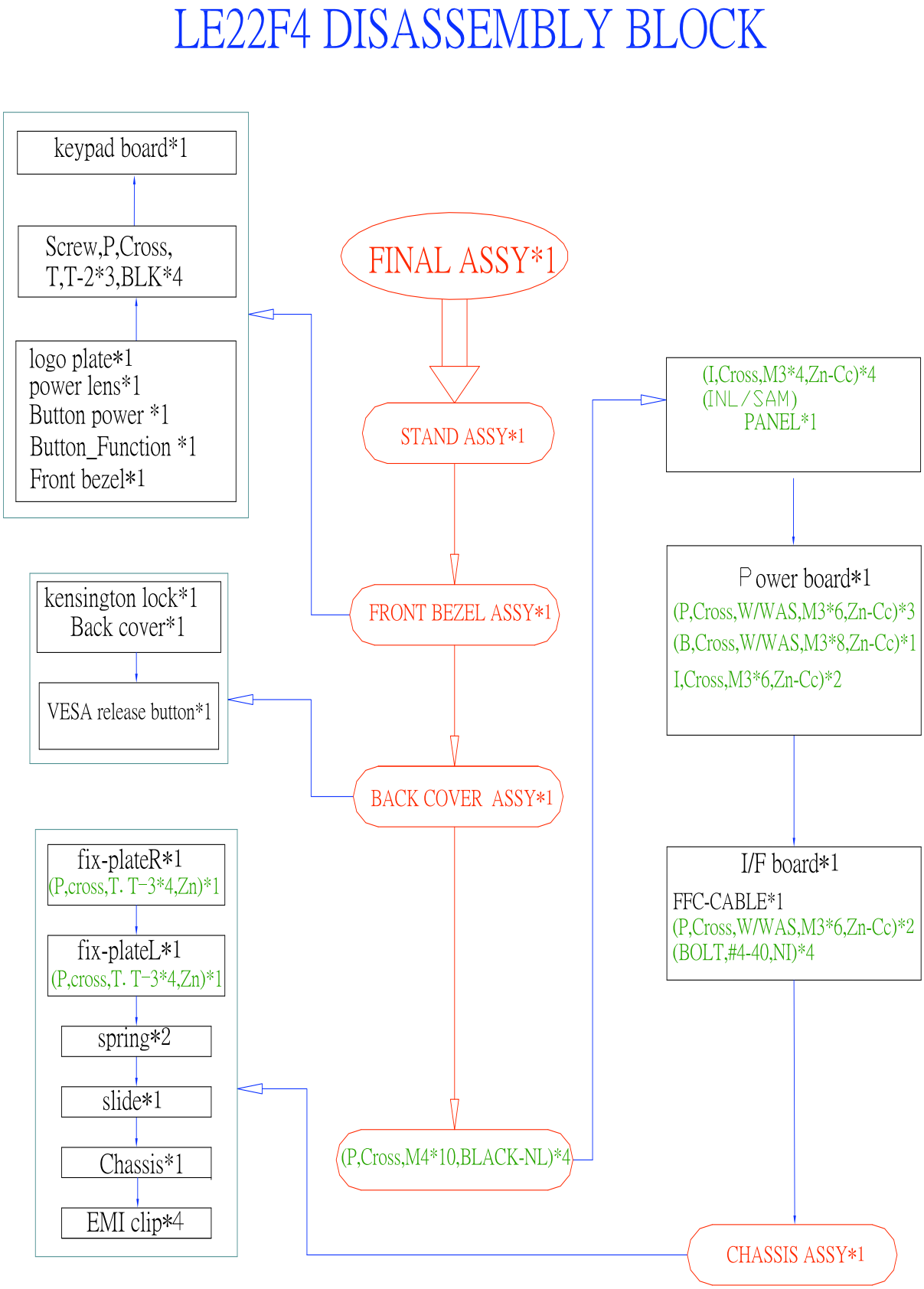
Pin	Symbol	I/O	Description
1	VSEN	I	Voltage sense Feedback
2	SSTCMP	I	Capacitor for soft-star and loop compensation
3	CT	I	Timing resistor and capacitor for operation and striking frequency
4	RT1	I	Timing resistor for striking frequency
5	GNDA		Signal Ground
6	PDR2	O	High side Driver output2
7	GNDP		Power Ground
8	NDR2	O	Low side Driver output2
9	NDR1	O	Low side Driver output1
10	PDR1	O	High side Driver output1
11	VDDA	I	Input power Pin
12	TIMER	I	Timing capacitor for Delay Timer
13	PWM	I	External PWM Dimming Input
14	ISEN	I	Current sense feedback
15	OVPT	I	Over-voltage protection threshold voltage
16	ENA	I	IC Enable/Disable

Chapter 4- Disassembly & Assembly

1. Exploded Diagram



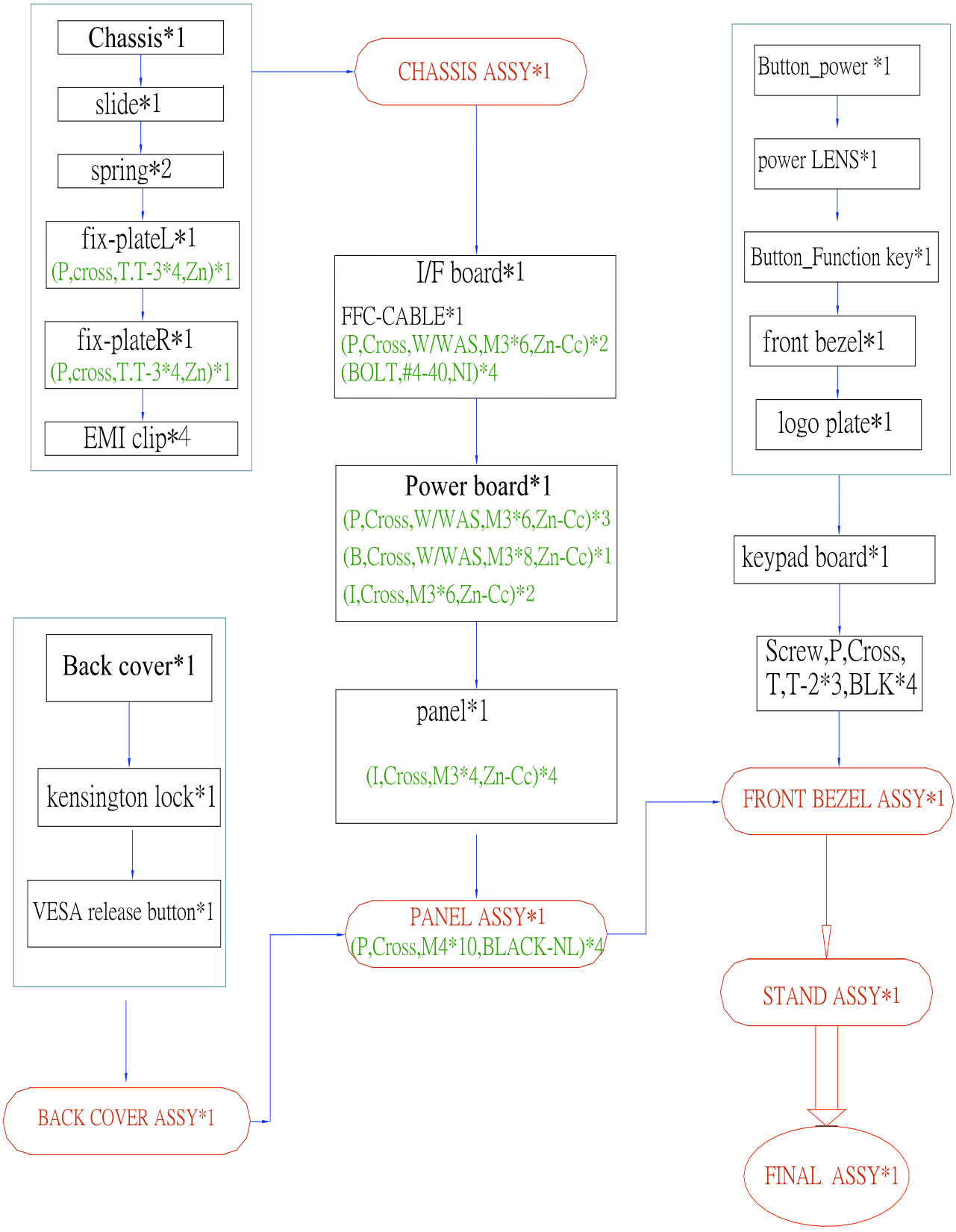
2. E2209WFPf Disassembly Block



Note: 1. The arrows point out the direction of disassembly.

3. Assembly Block

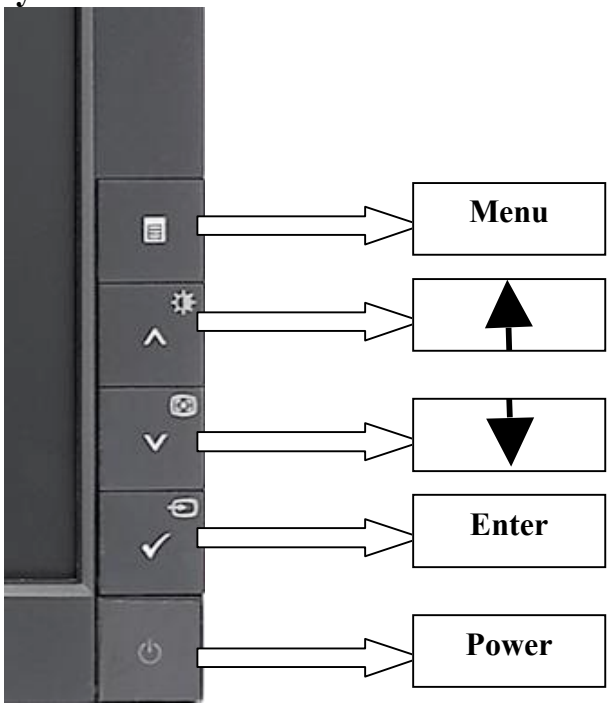
LE22F4 ASSEMBLY BLOCK



Note: 1. The arrows point out the direction of assembly

Chapter 5- TEST AND ADJUSTMENT

1. Function key Definitions



Power Switch with power LED indicator	*Power:* On/Off, includes power indicator and Power ICON green- Active On Amber- DPMS
Front Panel Controls	1- *Input select:* Select input signal 2- *Menu:* Call out OSD Menu and choose 3- (🡅): symbol molded into button, calls out brightness/Contrast, move down the highlight bar. 4-(🡇)symbol molded into button, move up the highlight bar
Hot Key Function	*Automatic adjust:* Directly press "🡇" *Brightness/Contrast Icon:* Directly press "🡅"
Factory Modes Keys Function	*Auto Color Balance* Purpose: Automatically calibrate chip ADC parameter by using chip internal DAC. Process: If we want to do "*Auto Color Balance*" again, please confirm the following steps. 1) Connect the VGA cable with the standard video pattern generator and display the pattern with blackest and whitest colors. 2) Press "*Power Key*", to power off the monitor. 3) Press "*Menu Key*" and "*Up Key*" simultaneously, and then press "*Power Key*" to power on the monitor. 4) Press "Plus Key", choose "Auto color" at bottom 5) Then execute *Auto Color* item. 6) After the "*Auto Color Balance*" process finished, go back to the submenu of "Other Settings", and press "Factory Reset" to exit

Factory mode.

OSD Control

1st Level	2nd Level	3rd Level	4th Level	5th Level
		Brightness		
		Contrast		
	Auto Adjust(For VGA)	Press √ to adjust the screen automatically		
		Auto Select		
	Input Source	VGA		
		DVI-D		
		Input Color Format	RGB	YPbPr
		Mode Selection	Graphics	Video
	Color Settings	Preset Modes	Standard MultiMedia Game Warm Cool Custom(R,G,B)	 R G B
		Reset Color Settings		
		Horizontal Position		
		Vertical Position		
		Sharpness		
		Pixel Clock		
		Phase		
		Reset Display Settings		
	Other Settings	Language	English Español Français Deutsch Português (Brasil) 简体中文 日本語	
		Menu Transparency		
		Menu Timer		
		Menu Lock	Lock	Unlock
		DDC/CI	Enable	Disable
		LCD Conditioning	Enable	Disable
		Factory Reset(Reset All settings)		

Factory Mode Introduction

With signal input, press "*Power*" button to turn off the monitor. Press "*Menu*" and "*Auto/Plus*" buttons together, and then press "*Power*" button to turn on the monitor. After power on.Press "Plus Key", enter Factory mode (Fig.10).

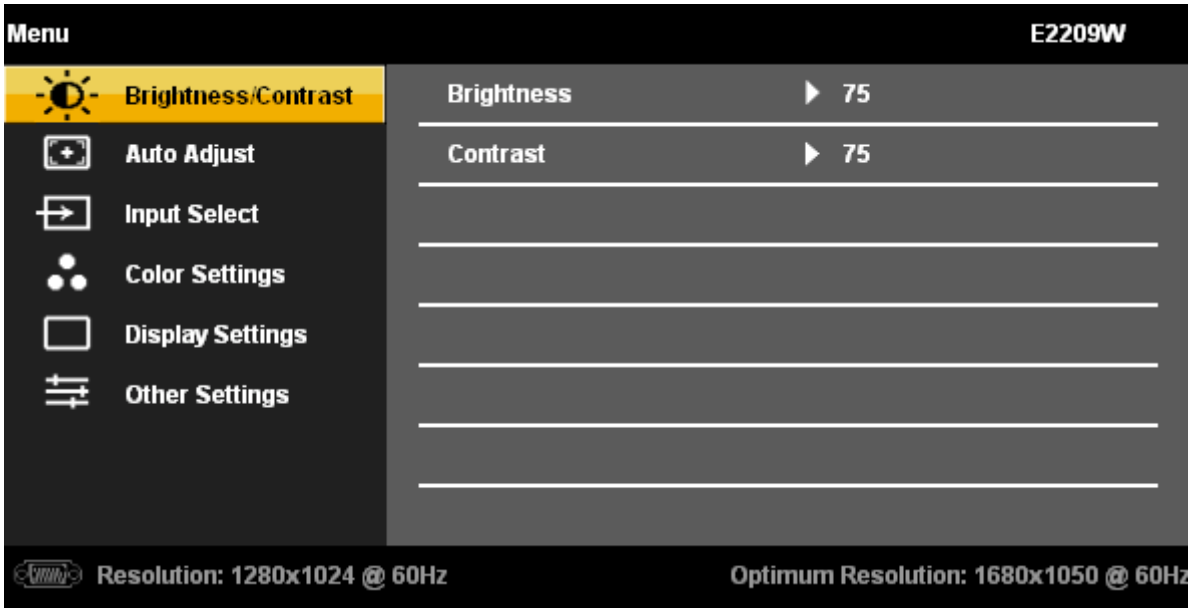


Fig9

Fig10

Back: Exit from Factory mode and back to NO OSD Status.
Panel: The current-setting panel is highlighted.
Auto Color: Automatically calibrate chip ADC parameters by using internal DAC.

Burn In: Enable or disable the Burn-in mode by choosing ON or OFF.
Reset Timer: Reset the "Turn-on time" of the panel to 0H0M.
Color Temp: The R, G, B of Blue Preset (9300K), Red Preset (5700K) and Normal Preset (6500K) are generated from scaling chip's back-end white-balance program.
Time: Turn-on time of the panel.
DEBUG: Debug tool of scale IC U104.

Dell panel P/N

LCD supplier	Panel	Supplier P/N	Dell P/N
Samsung	22"W	LTM220M1-L01	MY228
INL	22"W	MT220WW01-V0	D569C
CMO	22"W	M220Z1-L03	P546G

Burn-in pattern

Burn-in pattern will self-generate automatically without VGA and DVI cable plugged in when the monitor set at Burn-in on mode and burn-in pattern will not be stopped until plugging in the VGA cable. Exit Burn-in mode method as followe: plugging in the VGA/DVI cable, press "Menu" button to call out OSD Main Menu, Press "Plus Key"to select"Other Settings Menu"then pop submenu and choose Factory reset.

Auto Color Balance (Automatically calibrate chip ADC parameter by using chip internal DAC.)

5.1 If it is a new-built set, press "*Auto/Plus*" button to execute "Auto Color" at standard video pattern 5-MOSAIC pattern

5.2 Please confirm the following steps to perform "Auto Color Balance":

- Connect the VGA cable with the standard video pattern generator and display 5-MOSAIC pattern on the monitor.
- Press "*Power*" button to power off the monitor.
- Press "*Menu*" and "*Auto/Plus*" buttons simultaneously; then press "*Power*" button to power on the monitor.
- Press "Plus Key", select"Other Settings Menu" ,then Press "Plus Key"and choose factory at bottom
- Set *BurnIn Mode* item to ON, then execute *Auto Color* item.
- After the "*Auto Color Balance*" process finished, go back to "Other Settings Menu", and press "Factory Reset" to exit Factory mode

Upgrade Firmware to Serial via Flash Cable by ISP_Tool V4.100.exe

7.1 Connect the monitor and PC follow Fig 11

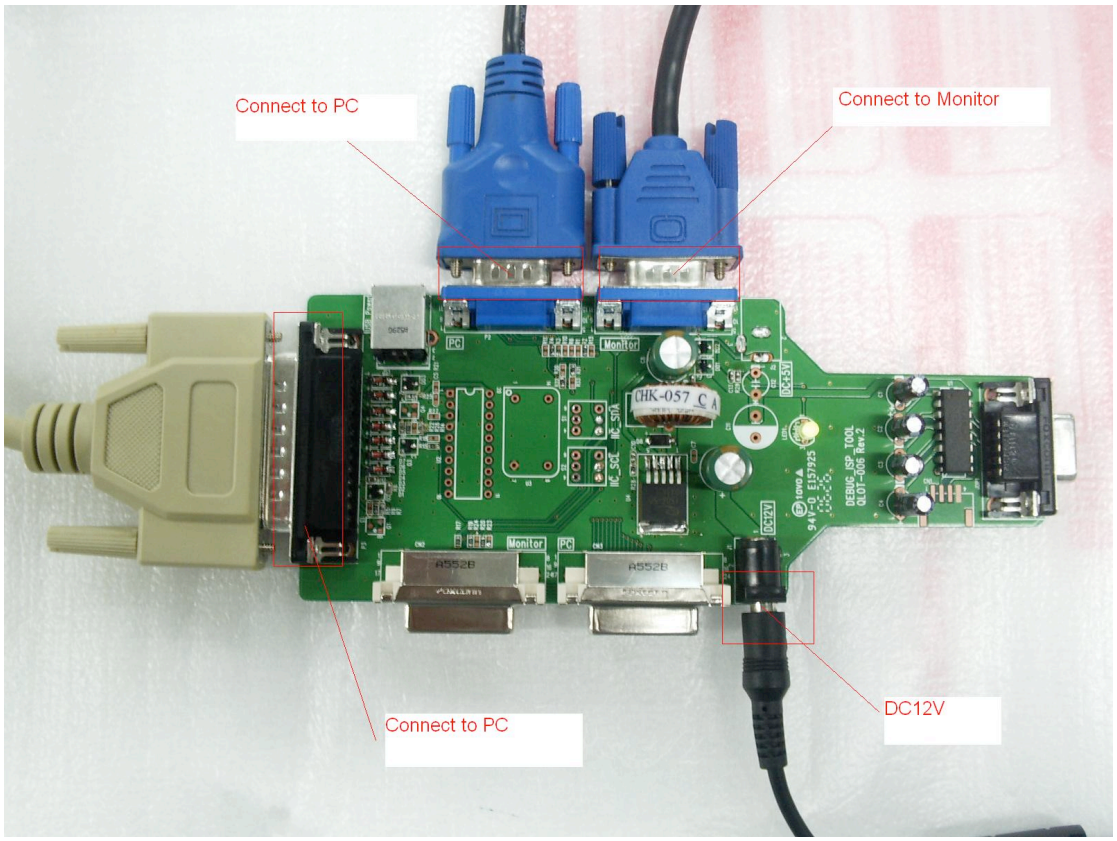


Fig 11

※ The detailed reprogramming procedures will be described in ISP User's Guide.

Edid 8.4.rar

E2209W V04.rar

ISP User's Guide_20070312.rar

ISP_Tool V4.100.rar

E2209W_MVT_M2F204_V05.rar

After repair, to ensure the quality you should do the following test and adjustment.

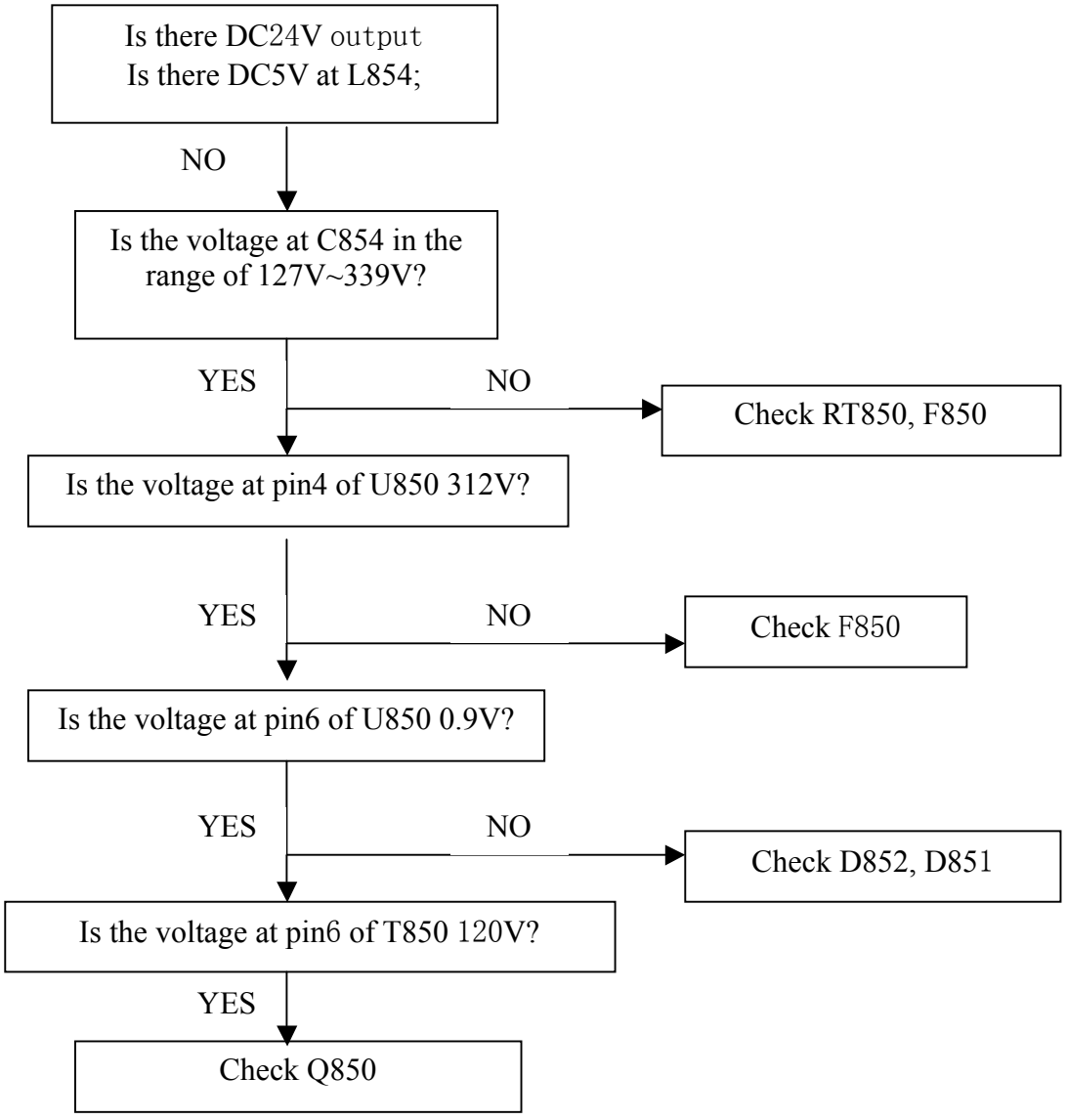
<table>
<tr><th>Item</th><th>Content</th><th>Equipment</th></tr>
<tr><td>Test OSD function</td><td>1.Signal is set as 1680×1050@60Hz under General-1
2. LCM button are from left to right, checking whether each single function key and compound function key can be worked.</td><td>Chroma
Signal Generator</td></tr>
<tr><td>Contrast Check</td><td>1. Set input mode to 1680×1050@60Hz
2. Set to 32gray scale pattern
3. Set contrast to the maximum. At most 6 bars cannot be distinguished.</td><td>Chroma
Signal Generator</td></tr>
<tr><td>Color Temperature</td><td>1. Do “Auto color Balance” at 1680×1050@60Hz, 32gray scale pattern
2. Measure color temperature, check if it complies with the following temperature :
Warm x=0.328 +/- 0.03, y=0.344+/-0.03
Desktop x= 0.313 +/- 0.03, y=0.329+/-0.03
Cool x= 0.283 +/- 0.03, y=0.298+/-0.03</td><td>Chroma Signal Generator and color analyzer</td></tr>
<tr><td>Modes switching check</td><td>1. Use Chroma Pattern Generator to make sequence. VESA (640x480 800x600 1024x768 1152x864 1280x1024 1680×1050@60Hz), the detail supported modes (see table 1) and power saving signal.
2. Confirm the above timing modes must be full screen and the picture must be normal.
3. LED is amber at power saving mode.</td><td>Chroma
Signal Generator</td></tr>
<tr><td>VGA cable detector</td><td>When select VGA model and VGA cable is not plugged out, self-test OSD will be floated.</td><td>Visual check</td></tr>
<tr><td>Y measurement at default setting</td><td>1. Set brightness and contrast to default value 75 at 6500K
2. With full white pattern, Y shall be 220 ± 20 cd/m^2</td><td>Chroma Signal Generator and Color Analyzer</td></tr>
<tr><td>OSD Lock Test
 </td><td>Soft Lock: When OSD is locked, this icon should appear for only 2 seconds with all buttons pressed, except for the “Menu” and “Power” ones.
Hard Lock: Press “Menu” button for 15 seconds enables the “locked” icon to be displayed, which will lock All buttons expect for the “Power”. Press “Menu” button for another 15 seconds enables the “unlock” icon to be shown.</td><td>Visual Inspection</td></tr>
<tr><td>Panel Flicker check</td><td>1. Mode:1680×1050@60Hz
2. Set Brightness& Contrast to default value (75%)
3. Do “Auto Adjustment”
4. Shut down PC to check whether there’s flicker on the center of the picture.</td><td>Equipment::
Chroma Signal Generator & PC</td></tr>
<tr><td>Power saving</td><td>1. Mode:1680×1050@60Hz
2. Pattern: full Black
3. Brightness: Max.
4. Contrast: Default
5. Check power consumption at each modes
<table>
<tr><th>State</th><th>Power Consumption</th><th>LED color</th></tr>
<tr><td>Normal(with full load)</td><td>＜46W</td><td>blue</td></tr>
<tr><td>Stand By</td><td>＜2W</td><td>amber</td></tr>
<tr><td>Power Key Off</td><td>＜1W</td><td>no</td></tr>
</table></td><td>Chroma signal generator and Power meter
AC input:230V/50Hz</td></tr>
</table>

Chapter 6- TROUBLE SHOOTING

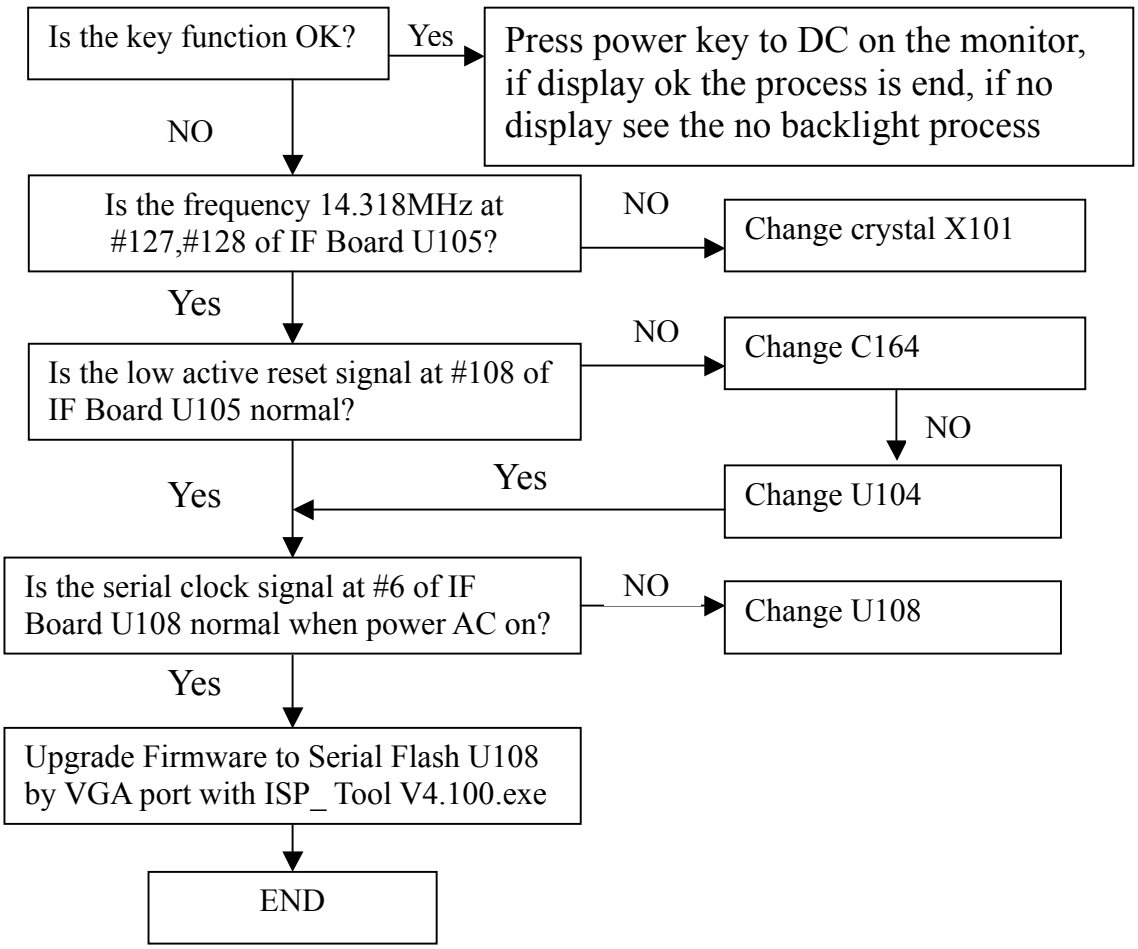
Common Acknowledge

- If you change the M/B, be sure that the U101,U102 and U105 these three components also changed to the new M/B because there was program inside. If not, please re-write EDID or upload firmware into serial flash(U105) via VGA Cable. How to do please refer to the Page 19.
- If you adjust clock and phase, please do it at condition of Windows shut down pattern.
- Please confirm the R/G/B color under 32gray scale pattern.
- This LCM is analog interface. So if the entire screen is an abnormal color that means the problem happen in the analog circuit part, if only some scale appears abnormal color that stand the problem happen in the digital circuit part.
- If you check the H/V position, please use the crosshatch pattern.
- This LCM support 10 timing modes, if the input timing mode is out of specification, “Cannot Display this Video Mode” will be displayed on the screen.
- If brightness uneven, repairs Inverter circuit or change a new panel.
- If you find the vertical line or horizontal line lost on the screen, please change panel.
- If the self-test pattern is moving on the screen, please check whether VGA Cable is plugged in the Monitor or PC if select analog model on OSD or check whether DVI Cable is plugged in the Monitor or PC if select DVI model on OSD . If the VGA or DVI Cable is plugged in well, please change another VGA or DVI cable.

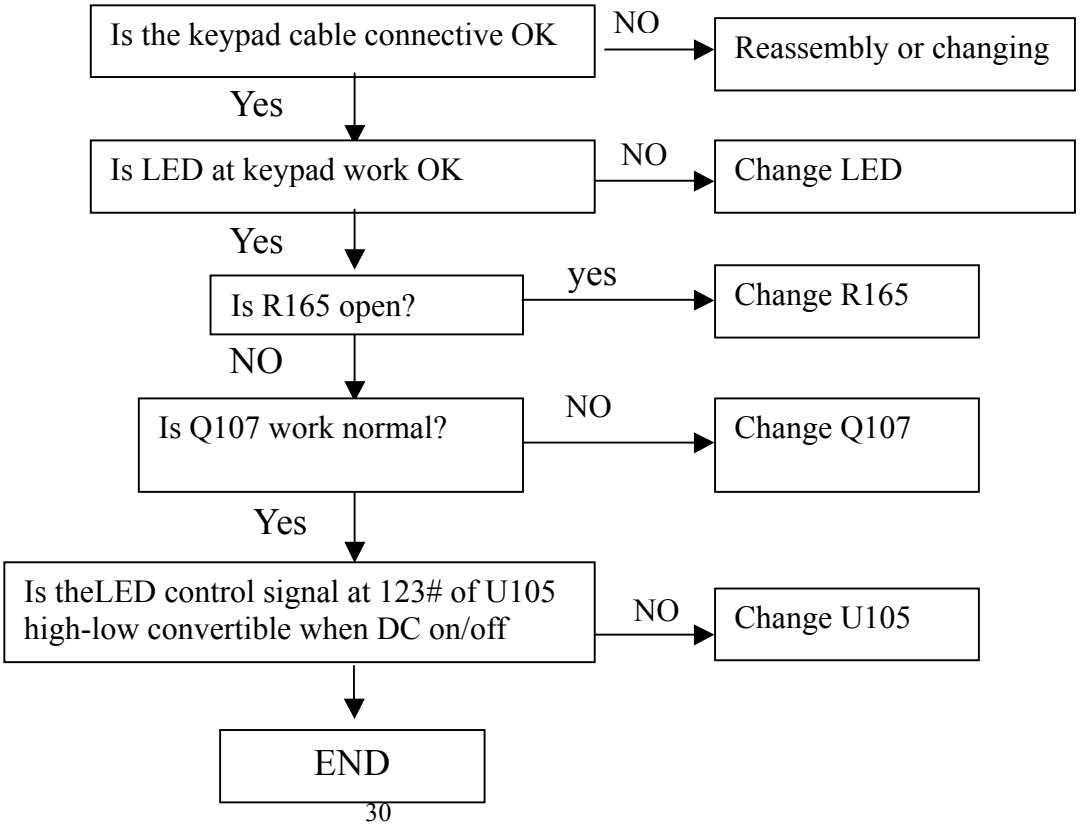
No Power and LED Off



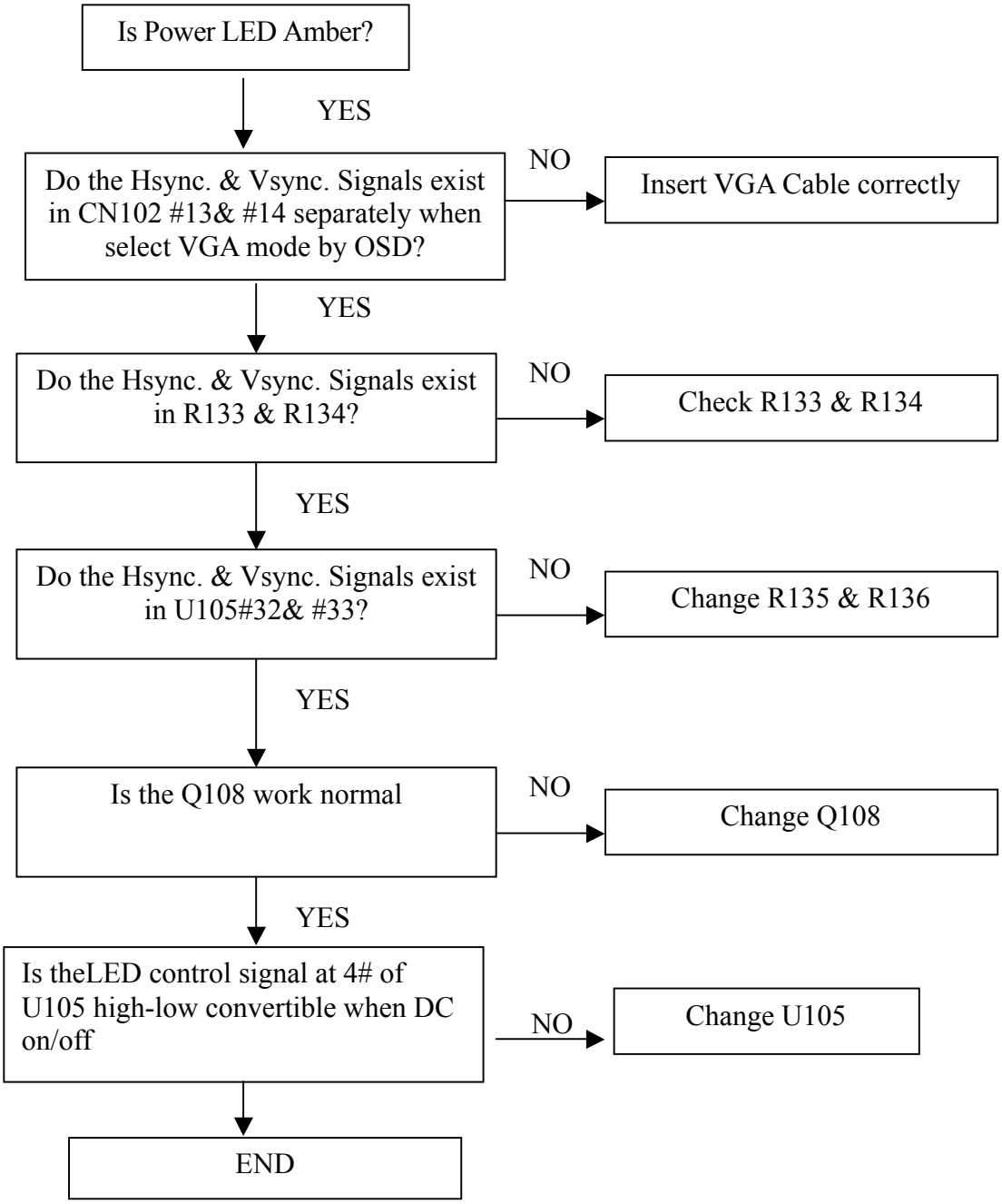
Power(include IF +5Vand +3.3V) supply normal but LED off and no display


Is the key function OK?
Yes
Press power key to DC on the monitor, if display ok the process is end, if no display see the no backlight process
NO
Is the frequency 14.318MHz at #127,#128 of IF Board U105?
NO
Change crystal X101
Yes
Is the low active reset signal at #108 of IF Board U105 normal?
NO
Change C164
NO
Yes
Yes
Change U104
Is the serial clock signal at #6 of IF Board U108 normal when power AC on?
NO
Change U108
Yes
Upgrade Firmware to Serial Flash U108 by VGA port with ISP_ Tool V4.100.exe
END

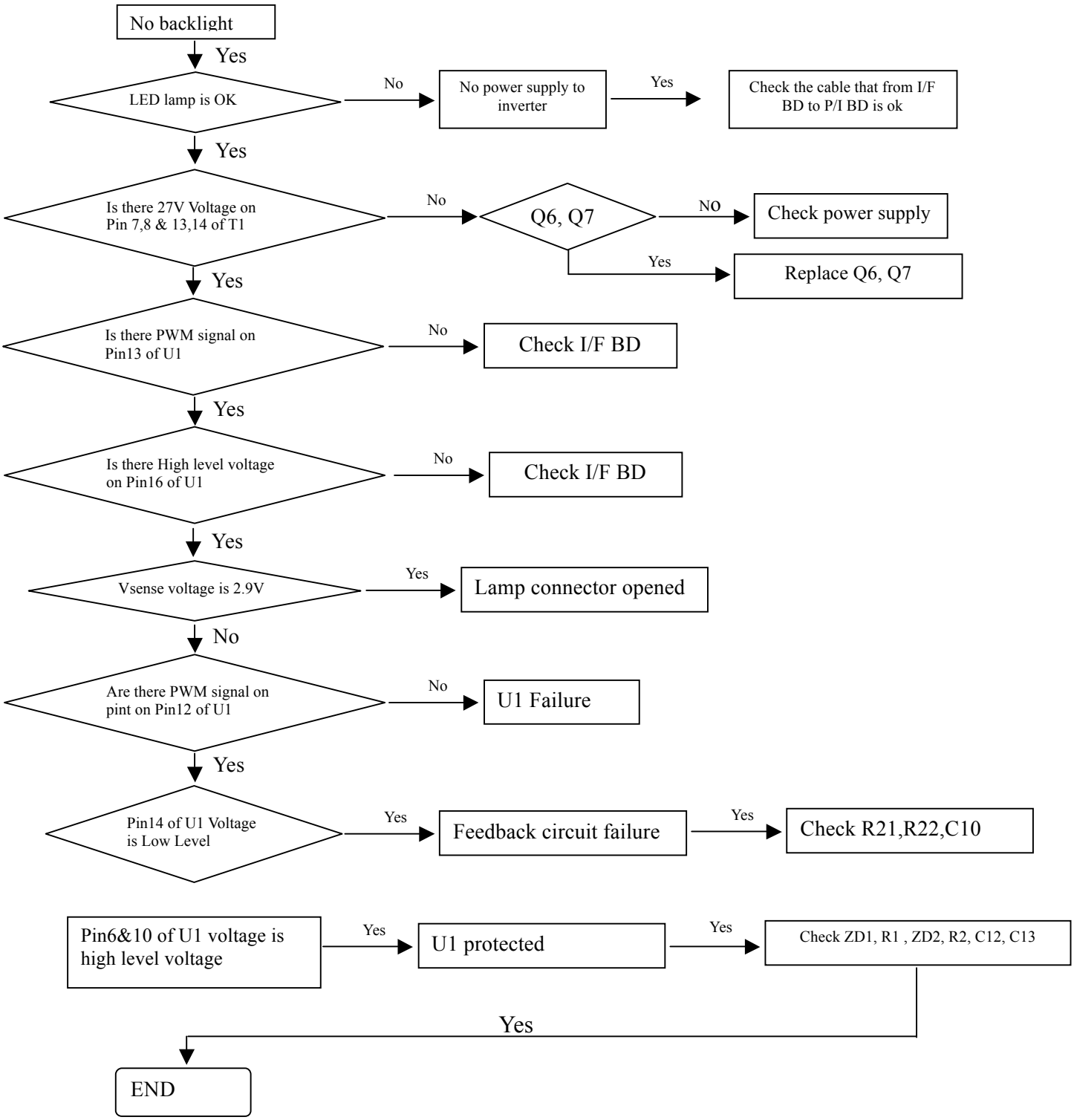
Power(include IF +5Vand +3.3V) supply and display normal only LED off



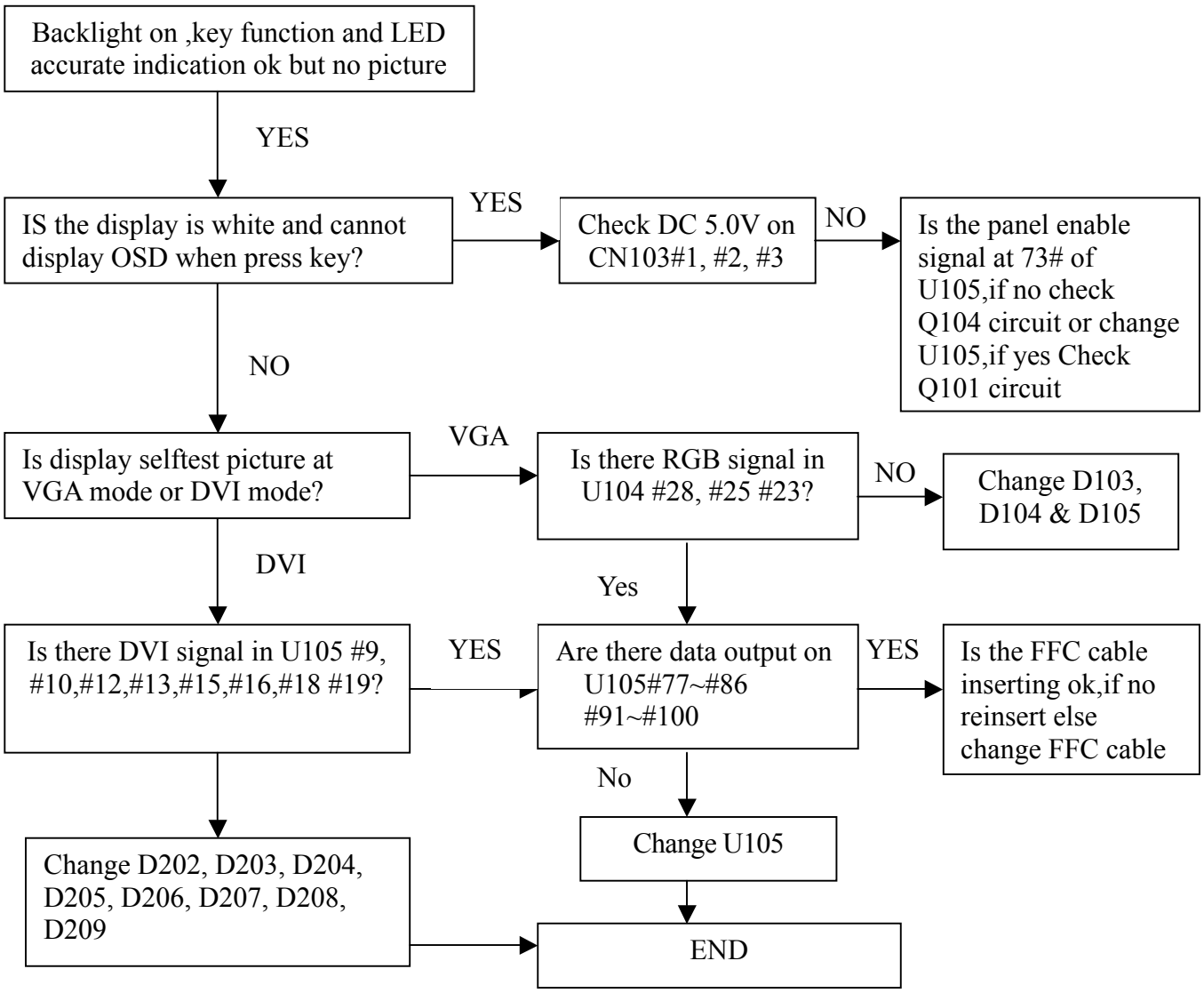
Power (include IF +5Vand +3.3V) supply and display normal but LED Amber


Is Power LED Amber?
YES
Do the Hsync. & Vsync. Signals exist in CN102 #13& #14 separately when select VGA mode by OSD?
NO
Insert VGA Cable correctly
YES
Do the Hsync. & Vsync. Signals exist in R133 & R134?
NO
Check R133 & R134
YES
Do the Hsync. & Vsync. Signals exist in U105#32& #33?
NO
Change R135 & R136
YES
Is the Q108 work normal
NO
Change Q108
YES
Is theLED control signal at 4# of U105 high-low convertible when DC on/off
NO
Change U105
END

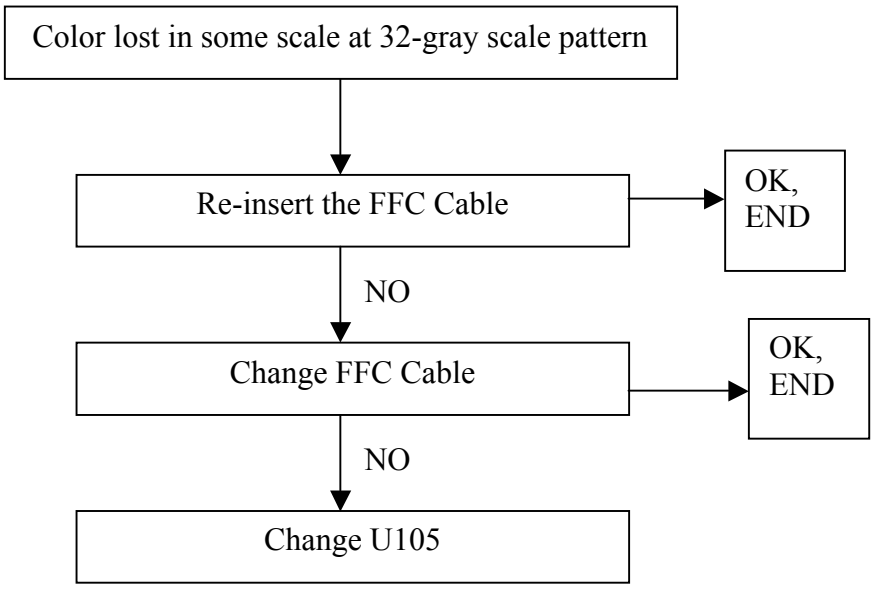
4.Power (include IF +5Vand +3.3V) supply normal ,key function OK,but backlight can't be turned on



5. Backlight on, key function and LED accurate indication ok but no picture


Backlight on ,key function and LED accurate indication ok but no picture
YES
IS the display is white and cannot display OSD when press key?
YES
Check DC 5.0V on CN103#1, #2, #3
NO
Is the panel enable signal at 73# of U105,if no check Q104 circuit or change U105,if yes Check Q101 circuit
NO
Is display selftest picture at VGA mode or DVI mode?
VGA
Is there RGB signal in U104 #28, #25 #23?
NO
Change D103, D104 & D105
DVI
Yes
Is there DVI signal in U105 #9, #10,#12,#13,#15,#16,#18 #19?
YES
Are there data output on U105#77~#86 #91~#100
YES
Is the FFC cable inserting ok,if no reinsert else change FFC cable
No
Change U105
Change D202, D203, D204, D205, D206, D207, D208, D209
END

6.At 32-gray scale pattern, color lost in some scale



Chapter 7- RECOMMENDED PART LIST

Content	PN	Description	Supplier	Usage
PI BD	412000628810R	IC LD7552BPS SOP8（Leadtrend)ROHS	LEADTREND,	1
	412000654630R	IC INL833GN SOP16(O2 MICRO)Rohs	O2,	1
	426000091010R	XFMR SW DIP ERL28 PC40 550uH SPW-101 RoH	FOXCONN,FRONTIER,LISHIN,MEIKAI,	0
	426000091160R	XFMR SW DIP EEL22 P4 4.16H SPW-116 ROHS	DARFON,FOXCONN,HUALON,LISHIN,	1
	420431014083R	CAP SEK 100uF/450V M,105℃ CF 18x40(2.5)	ELITE,SAMXON,SU'SCON,	0
	410500059290R	XSTR AP2761I-A N-CH TO-220CFM ADVANCED P	APEC	1
	410050103050R	XSTR FMA09N65GX N-CH TO-220F(FUJI) RoHS	FUJI	0
	410050057280R	XSTR STP8NK80ZFP N-CH TO220FP (ST)	ST	0
	491571400100H	PCB,P/I ,1/OSP /CEM1/16,LE22F4-612	HSIANGKUO,TAT CHUN,	1
IF BD	412000653060R	IC TSUMU58EHJ-LF-2 PQFP128(MSTAR)Rohs E	MSTAR	1
	412000494190R	IC SST25LF020A-33-4C-SAE SOIC8(SST)ROHS	SST,	1
	412000494310R	IC PM25LV020-100SCE SOIC8(PMC)RoHS	PMC,	0
	412000224482R	IC AT24C16BN-SH-T 16K(ATMEL) SOIC 8 ROHS	ATMEL,	1
	412000224280R	IC M24C16-WMN6TP SO8 16K (ST) ROHS	ST,	0
	412000481990R	IC CAT24C16WI-TE13 SOIC-8(CATALYST)RoHS	CATALYST,	0
	412000332020R	IC LD1117AL-3.3-A TO-252(UTC)RoHS	UTC,	1
	412000332130R	IC AP1117D33LA 3.3V (ANACHIP) TO-252-3L,	ANACHIP,	0
	412000332830R	IC AS1117R-3.3.TR-LF,TO-252(A1 SEMI)RoHS	A1SEMI,	0
	412000330020R	IC LD1117AL-1.8V-A SOT223(UTC) RoHS	UTC,	1
	412000330830R	IC AS1117L-1.8/TR-LF,SOT223(A1 SEMI)RoHS	A1SEMI,	0
	412000330070R	IC AZ1117H-1.8 SOT223(AAC)RoHS	BCD,	0
	412000435481R	IC AT24C02BN-SH-T 2K SOIC8(ATMEL)RoHS	ATMEL,	1
	412000480280R	IC M24C02-RMN6TP SO8(ST)RoHS	ST,	0
	412000480990R	IC CAT24C02WI-TE13 SOIC-8(CATALYST)RoHS	CATALYST,	0

ATTACHMENT 1- Bill of Material

1. Interface board BOM

2E+07

ITEM	P/N	Description	Supplier	Usage	Location
	791701300B00R	PCBA,I/F BOARD W/O SPK,LE22F4-B12 ROHS			
10	629030018710R	PROGRAM,W/O SPK LE22F4-B12 ROHS		1	
20	791701320600R	PCBA,I/F BOARD,MI,W/O SPK,LE22F4-612 ROH		1	
30	791701340600R	PCBA,I/F BOARD,SMT,W/O SPK,LE22F4-612 RO		1	
40	511130001200R	SOLDER BAR,Sn96.5/Ag3.0/Cu0.5/Ni0.06/Ge0	TOMAS,	2.2	
50	641120000010R	HDCP RECEIVE DEVICE KEY	DCP LLC,	1	
60	506140005700R	LABEL,BARCODE,BLANK,33x7mm, ROHS,FOR PCB	HENGMINGDA,JIAYINMEI,KAIDA,	1	

2E+07

ITEM	P/N	Description	Supplier	Usage	Location
	791701320600R	PCBA,I/F BOARD,MI,W/O SPK,LE22F4-612 ROH			
10	430631080170R	WFR 8P 2.0MM 180° W/LOCK ROHS	CVILUX,FOXCONN,JOWLE,	1	CN101,
20	440819015030R	CON D-SUB FEM.15P RA W/O SCREW DZ11AA1-H	CVILUX,DLK,FOXCONN,JOWLE,TEKCON,ZJGHJ,	1	CN102,
30	430631080180R	WFR 2X4P 2.0MM 180° W/LOCK ROHS	CVILUX,FOXCONN,	1	CN104,
40	443842024060R	CON DVI-D RA 24+1P FEM.W/O SCR EW QH1112	DLK,FOXCONN,ZJGHJ,	1	CN201,
50	432008010270R	XTAL 14.31818MHz HC-49US DIP 16pF 30PPM	HUAN MOUN,TXC,ZGC,	1	X101,
60	420271010460R	CAP SE 100uF 16V M,105℃ ST,6.3*11 ROHS	SAMXON,SU'SCON,TEAPO,	2	C109,C102,
70	420432200460R	CAP EC 22uF 16V M,105℃ ST, 5x11,RoHS	ELITE,LELON,SAMXON,SU'SCON,TEAPO,	3	C103,C142,C150,

2E+07

ITEM	P/N	Description	Supplier	Usage	Location
	791701340600R	PCBA,I/F BOARD,SMT,W/O SPK,LE22F4-612 RO			
10	444099030040R	CON, SMD 1.0MM 30PIN with lock RoHS	CVILUX,P-TWO,	1	CN103,
20	419351044010R	C SMD(0402) X5R 0.1uF/16V K,RoHS	DARFON,WALSIN,YAGEO,	53	C106,C108,C110,C126,C128,C133,C134,C135,C136, C137,C138,C139,C140,C141,C143,C144,C145,C146, C147,C149,C153,C154,C155,C156,C159,C160,C161, C165,C167,C168,C169,C170,C171,C172,C173,C201, C202,C213,C111,C122,C123,C124,C125,C203,C204, C205,C206,C207,C208,C209,C210,C211,C212,
30	419311054070R	C SMD(0805) X7R 1uF/16V K RoHS REV:A	DARFON,MURATA,TDK,WALSIN,	2	C112,C164,
40	419314734010R	C SMD(0402) X7R 0.047uF/16V K,RoHS	DARFON,WALSIN,YAGEO,	7	C113,C114,C115,C119,C120,C121,C152,
50	419302700510R	C SMD(0402) NPO 27PF/50V J RoHS	DARFON,MURATA,TDK,WALSIN,YAGEO,	2	C130,C129,
60	419351054060R	C SMD(0603) X5R 1uF/16V K,RoHS	DARFON,MURATA,SAMSUNG,TDK,WALSIN,YAGEO,	1	C148,
70	419302200510R	C SMD(0402) NPO 22PF/50V J,RoHS	DARFON,MURATA,TDK,WALSIN,YAGEO,	2	C157,C158,
80	411020026210R	DIO BAV99 350mW 70V SOT-23(PHI RoHS	PHILIPS,	13	D102,D103,D104,D105,D202,D203,D204,D205,D206, D207,D208,D209,D210,
80	411020026090R	DIO BAV99 350mW 75V SOT-23(PEC RoHS	PANJIT,	0	
80	411020026020R	DIO BAV99-LF 350mW 70V SOT-23 (FEC)RoHS	FRONTIER,	0	
90	411020047210R	DIO BAV70 85V SOT23 (PHILIPS) RoHS	PHILIPS,	2	D106,D201,
90	411020047090R	DIO BAV70, 70V SOT-23(PEC) ROHS	PANJIT,	0	
90	411020047020R	DIO BAV70-LF, 70V SOT-23(FEC) ROHS	FRONTIER,	0	
100	432002312144R	BEAD CORE SMD(0603)120Ω 300mA SBK160808	CHILISIN,TAI-TECH,	1	FB101,
110	432002360140R	BEAD CORE SMD(0603)60Ω 600mA, GBK160808	CHILISIN,TAI-TECH,	2	FB102,FB105,
120	410500068290R	XSTR AP2305GN P-CH SOT23(APEC) RoHS	APEC,	1	Q101,
120	410500075270R	XSTR AO3415 P-CH,SOT23(AOS) RoHS	AOS,	0	
120	410060018380R	XSTR AM2321P-T1-PF P-CH SOT23(ANALOG POW	AP,	0	
130	410500045210R	XSTR PMBT3904 NPN 200MA,40V SOT23(PHILIP	PHILIPS,	3	Q104,Q201,Q103,
130	410500045140R	XSTR MMBT3904LT1G NPN 200MA 40V SOT23(ON	ON SEMI,	0	
130	410500045090R	XSTR MMBT3904 NPN SOT-23(PANJIT)RoHS	PANJIT,	0	
140	410500046210R	XSTR PMBT3906 PNP 200MA,40V SOT23(PHILIP	PHILIPS,	2	Q107,Q108,
140	410500046090R	XSTR MMBT3906 PNP SOT-23(PANJIT)RoHS	PANJIT,	0	
140	410500046180R	XSTR MMBT3906LT1G PNP 200mA 40V SOT23(ON	ON SEMI,	0	
150	414904000050R	RES SMD (1206) 0Ω J,RT RoHS REV:A	TA-I,WALSIN,YAGEO,	2	R101,R113,
160	414916000050R	RES SMD (0603) 0Ω J,RT RoHS	TA-I,WALSIN,YAGEO,	4	RB101,RB102,RB103,R164,
170	414918010350R	RES SMD (0402) 10KΩ J,RT,RoHS	TA-I,WALSIN,YAGEO,	24	R102,R129,R140,R150,R151,R152,R166,R169,R171, R172,R174,R176,R177,R178,R179,R180,R190,R192, R213,R217,R103,R220,R184,R161,
180	414918000050R	RES SMD (0402) 0Ω J,RT,RoHS	TA-I,WALSIN,YAGEO,	3	R121,R147,R148,
190	414918047250R	RES SMD (0402) 4.7KΩ J,RT,RoHS	TA-I,WALSIN,YAGEO,	10	R105,R110,R127,R128,R137,R138,R188,R211,R212, R219,
200	414918010450R	RES SMD (0402)100KΩ J,RT,RoHS	TA-I,WALSIN,YAGEO,	4	R107,R109,R106,R175,
210	414918047350R	RES SMD (0402) 47KΩ J,RT,RoHS	TA-I,WALSIN,YAGEO,	1	R108,
220	414918750910R	RES SMD (0402) 75Ω F,RT,RoHS	TA-I,WALSIN,YAGEO,	9	R117,R118,R119,R114,R115,R116,R122,R123,R124,
230	414918047150R	RES SMD (0402) 470Ω J,RT,RoHS	TA-I,WALSIN,YAGEO,	1	R159,
240	414918010250R	RES SMD (0402) 1KΩ J,RT,RoHS	TA-I,WALSIN,YAGEO,	15	R130,R133,R134,R145,R146,R153,R154,R155,R160 R191,R214,R125,R216,R157,R158,
250	414918010150R	RES SMD (0402) 100Ω J,RT,RoHS	TA-I,WALSIN,YAGEO,	6	R131,R132,R142,R143,R209,R210,
260	414918022250R	RES SMD (0402) 2.2KΩ J,RT,RoHS	TA-I,WALSIN,YAGEO,	2	R135,R136,
270	414918390010R	RES SMD (0402) 390Ω F,RT,RoHS	TA-I,WALSIN,YAGEO,	1	R144,
280	414916033150R	RES SMD (0603) 330Ω J,RT RoHS	TA-I,WALSIN,YAGEO,	1	R165,
290	414918010050R	RES SMD (0402) 10Ω J,RT,RoHS	TA-I,WALSIN,YAGEO,	8	R201,R202,R203,R204,R205,R206,R207,R208,
300	412000332130R	IC AP1117D33LA 3.3V (ANACHIP) TO-252-3L,	ANACHIP,	1	U101,
300	412000241550R	IC AME1117CCCTZ 3.3V,TO-252(AM E)RoHS	AME,	0	
300	412000332020R	IC LD1117AL-3.3-A TO-252(UTC)RoHS	UTC,	0	
300	412000332830R	IC AS1117R-3.3.TR-LF,TO-252(A1 SEMI)RoHS	A1SEMI,	0	
310	412000330020R	IC LD1117AL-1.8V-A SOT223(UTC) RoHS	UTC,	1	U102,
310	412000330830R	IC AS1117L-1.8/TR-LF,SOT223(A1 SEMI)RoHS	A1SEMI,	0	
310	412000330070R	IC AZ1117H-1.8 SOT223(AAC)RoHS	BCD,	0	
310	412000598490R	IC MT11171.8A SOT223(Matrix) RoHS	MATRIX,	0	

320	412000435481R	IC AT24C02BN-SH-T 2K SOIC8(ATMEL)RoHS	ATMEL,	2	U103,U201,
320	412000480280R	IC M24C02-RMN6TP SO8(ST)RoHS	ST,	0	
320	412000480990R	IC CAT24C02WI-TE13 SOIC-8(CATALYST)RoHS	CATALYST,	0	
330	412000653060R	IC TSUMU58EHJ-LF-2 PQFP128(MSTAR)Rohs	MSTAR,	1	U105,
340	412000224482R	IC AT24C16BN-SH-T 16K(ATMEL) SOIC 8 ROHS	ATMEL,	1	U106,
340	412000224280R	IC M24C16-WMN6TP SO8 16K (ST) ROHS	ST,	0	
340	412000481990R	IC CAT24C16WI-TE13 SOIC-8(CATALYST)RoHS	CATALYST,	0	
350	412000494190R	IC SST25LF020A-33-4C-SAE SOIC8(SST)ROHS	SST,	1	U108,
350	412000494310R	IC PM25LV020-100SCE SOIC8(PMC)RoHS	PMC,	0	
360	411130962950R	ZENER 6.2V MMSZ5234B SOD-123(PANJIT)RoH	PANJIT,	9	ZD102,ZD103,ZD104,ZD105,ZD106,ZD201, ZD203,ZD204,ZD107,
360	411121462950R	ZENER 6.2V BZT52-C6V2 SOD-123(WILLAS)ROH	WILLAS,	0	
360	411131562950R	ZENER 6.2V BZT52C6V2-7-F SOD-123(DIODES)	DIODES,	0	
370	491351300100H	PCB I/F BOARD LE19H0	TIP TOP,WELFARE,	1	
380	414916056150R	RES SMD (0603) 560Ω J,RT RoHS REV:A	TA-I,WALSIN,YAGEO,	1	R168,

2. power board BOM

ITEM	P/N	Description	Supplier	Usage	Location
	791701400600R	PCBA,P/I BOARD W/O SPK,LE22F4-612 ROHS			
10	430637020030R	WFR. 2P P=3.5mm 90°W/LOCK,RoHS	CVILUX,FCN,FOXCONN,	4	CN1,CN2,CN3,CN4,
20	440149000350R	SKT AC 10A/250V U/C/V, H 1.0MM ROHS	TECX,	1	CN850,
30	430300801650R	HRN ASS'Y 8P 130mm UL1007 24 AWG ROHS	FOXCONN,HEIGHTEN,JVE,	1	CN853,
40	420424710510R	CAP SD 470uF/50V M 105℃ F 13x21 RoHS	LELON,SAMXON,SU'SCON,TEAPO,	2	C20,C863,
50	418103051920R	CAP CD NPO 3pF 3KV D,S7.5, RoHS	JNC,SUCCESS(SEC),	4	C21,C22,C23,C24,
50	418103058920R	CAP CD SL 3pF 3KV D,S7.5,RoHS	JNC,SUCCESS(SEC),	0	
60	418105051920R	CAP CD NPO 5pF 3KV D,S7.5, RoHS	JNC,SUCCESS(SEC),	2	C25,C27,
70	416202223610R	CAP MEY 2200pF 250V M Y2 Y5V P=7.5mm RoH	JNC,POE,SUCCESS(SEC),TDK,	2	C850,C851,
70	416202223620R	CAP MEY 2200pF 250V M Y2 Y5V,W /O FORMIN	JNC,POE,SUCCESS(SEC),	0	
80	416194743011R	CAP MEX 0.47uF 275V K X2,F15 RoHS	ARCOTRONIC,EUROPTRONIC,HJC,SCC,	1	C852,
90	420431014083R	CAP SEK 100uF/450V M,105℃ CF,18x40(2.5)	ELITE,SAMXON,SU'SCON,	1	C854,
100	416213323620R	CAP MEY 3300pF 250V M Y1,F10mm W/O FORMI	JNC,POE,SUCCESS(SEC),	1	C860,
110	416304723510R	CAP PP 0.0047uF 250V J,F7.5 RoHS	EUROPTRONIC,HJC,SCC,	1	C875,
120	415502438551R	RES NKNP 2W 0.43Ω J, MINI,HK15,ROHS	FUTABA,QUEENMAO,TZAI YUAN,	1	R859,
130	415350511550R	RES MOF 2W 510Ω J,MINI HK15,ROHS	FUTABA,QUEENMAO,TZAI YUAN,	1	R888,
140	432009400701R	NTC 5Ω 4A 10φ P=5mm, F RoHS	THINKING,UPPERMOST,	1	RT850,
150	426000050070R	CHOKE L-FILTER 12mH LIN-007 ET-20,RoHS	DARFON,FOXCONN,LISHIN,MEIKAI,TDK,	1	L850,
160	425000010530R	COIL CHK 5uH 7.8X10 CHK-053 0 181085R0L	CHILISIN,DARFON,EASYMAGNET, FOXCONN,FRONTIER,TAICHANG,	2	L854,L856,
170	411050012010R	DIO BRDG GBU405 600V/4A(TSC)RoHS	TSC,	1	D850,
170	411050012020R	DIO BRDG GBU4-06-BF52 600V/4A(FEC)RoHS	FRONTIER,	0	
180	411030068020R	DIO SF50-04F69-LF 400V/5A DO-201AD(FEC)R	FRONTIER,	2	D854,D855,
180	411030068450R	DIO SF55PT-F 400V/5A DO-201AD(CHENMKO)RO	CHENMKO,	0	
180	411030068520R	DIO SF50GG-E1 400V/5A DO-201AD(LITEON)R	LITEON,	0	
200	426000091160R	XFMR SW DIP EEL22 P4 800uH SPW-116 ROHS	DARFON,FOXCONN,HUALON,LISHIN,	1	T1,
210	426000091010R	XFMR SW DIP ERL28 PC40 550uH SPW-101 RoH	FOXCONN,FRONTIER,LISHIN,MEIKAI,	1	T850,
220	412140002380R	IC LTV817M-PR VDE (LITE-ON) P=10mm RoHS	LITEON,	1	I850,
240	735110007800R	ASSY,H/S,Q850, LE19E6-812,ROHS		1	
250	791701440600R	PCBA,PWR&INV./B,SMD,LE22F4-612 ROHS		1	
260	415350100550R	RES MOF 2W 10Ω J,MINI,HK15, RoHS	FUTABA,QUEENMAO,TZAI YUAN,	1	R861,
270	735110008100R	ASSY,H/S,SRF10-10CT-LF,LE22F4 ,ROHS		1	

280	432002200190R	FERR BEAD 3.5x9x0.65,VT,RoHS,RH03509ST-B	CHILISIN,TAI-TECH,	2	L857,L858,
290	511130001200R	SOLDER BAR,Sn96.5/Ag3.0/Cu0.5/Ni0.06/Ge0	TOMAS,	8.2	
300	511110000103R	HOT-MELT ADHESIVES,UB-618	U-BOND,	1.45	
300	511110000101R	HOT-MELT ADHESIVES (#526)	EXCELSTAR,	0	
310	511110000501R	SILICONE RTV RUBBER,UB-511(EURO)	EURO,	0.45	

ITEM	P/N	Description	Supplier	Usage	Location
	735110007800R	ASSY,H/S,Q850, LE19E6-812,ROHS			
10	410050103050R	XSTR FMA09N65GX N-CH TO-220F(FUJI) RoHS	FUJI,	1	Q850,
10	410500059290R	XSTR AP2761I-A N-CH TO-220CFM ADVANCED P	APEC,	0	
10	410050057280R	XSTR STP8NK80ZFP N-CH TO220FP (ST)	ST,	0	
30	507300003300R	HEATSINK,"L", LE1713/1913	DMC,ORIENTAL POWER,	1	
40	509146306200R	SCREW,P,CROSS,W/WAS,M3*6,Zn-Cc	GAOYI,LIQUAN,YIJIE,	1	

ITEM	P/N	Description	Supplier	Usage	Location
	735110008100R	ASSY,H/S,SRF10-10CT-LF,LE22F4 ,ROHS			
10	411090009020R	SCHTKY SRF10-10CT-LF 100V/10A TO-220AB(F	FRONTIER,	1	D860,
10	411090009312R	SCHTKY,SBR10100CTFP 100V/10A ITO-220AB(D	DIODES,	0	
10	411090009010R	SCHTKY MBRF10100CT 100V/10A(TS C)ITO-220	TSC,	0	
20	507200004200R	HEATSINK,35x16.7xt10mm, LE1911	DMC,ORIENTAL POWER,	1	
30	509146308102R	SCREW,PW,CROSS W/WAS,M3*8,Zn	GAOYI,LIQUAN,YIJIE,	1	

ITEM	P/N	Description	Supplier	Usage	Location
	791701440600R	PCBA,PWR&INV./B,SMD,LE22F4-612 ROHS			
10	419312720070R	C SMD (0805) X7R 2700pF 50V K ROHS	DARFON,TDK,WALSIN,YAGEO,	4	C1,C15,C16,C17,
20	419311054070R	C SMD(0805) X7R 1uF/16V K RoHS REV:A	DARFON,MURATA,TDK,WALSIN,YAGEO,	1	C2,
30	419311020070R	C SMD(0805) X7R 1000PF/50V K RoHS	DARFON,TDK,WALSIN,YAGEO,	4	C4,C5,C847,C848,
40	419312233070R	C SMD(0805) X7R 0.022uF/25V K RoHS	DARFON,TDK,WALSIN,YAGEO,	2	C6,C14,
50	419314730070R	C SMD(0805) X7R 0.047uF/50V K ROHS	DARFON,TDK,WALSIN,YAGEO,	3	C12,C13,C7,
60	419312210070R	C SMD(0805) X7R 220PF/50V K RoHS	DARFON,TDK,WALSIN,YAGEO,	1	C8,
70	419311040070R	C SMD(0805) X7R 0.1uF/50V K RoHS REV:A	DARFON,TDK,WALSIN,YAGEO,	5	C9,C10,C871,C876,C26,
80	419311030070R	C SMD(0805) X7R 0.01uF/50V K RoHS	DARFON,TDK,WALSIN,YAGEO,	3	C11,C849,C859,
90	414908510110R	RES SMD (0805) 5.1KΩ F,RT RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	3	R1,R2,R858,
100	414908027350R	RES SMD (0805) 27KΩ J,RT RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	4	R3,R4,R14,R15,
110	414908383010R	RES SMD (0805) 383Ω F,RT,RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	2	R6,R19,
120	414908100310R	RES SMD (0805) 100KΩ F,RT,RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	3	R5,R22,R848,
130	414908953210R	RES SMD (0805) 95.3KΩ F,RT RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	1	R16,
140	414908510210R	RES SMD (0805) 51KΩ F,RT RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	2	R8,R18,
150	414908010550R	RES SMD (0805) 1MΩ J,RT RoHS REV:A	TA-I,UNIOHM,WALSIN,YAGEO,	2	R9,R10,
160	414908100210R	RES SMD (0805) 10KΩ F,RT RoHS REV:A	TA-I,UNIOHM,WALSIN,YAGEO,	8	R12,R13,R21,R23,R860, R884,R886,R887,
170	414908330310R	RES SMD (0805) 330KΩ F,RT RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	1	R17,
180	414908100110R	RES SMD (0805) 1KΩ F,RT RoHS REV:A	TA-I,UNIOHM,WALSIN,YAGEO,	4	R20,R24,R30,R31,
190	414908047050R	RES SMD (0805) 47Ω J,RT RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	2	R840,R844,
200	414904499310R	RES SMD (1206) 499KΩ F,RT RoHS REV:A	TA-I,UNIOHM,WALSIN,YAGEO,	6	R841,R842,R843,R850,R851,R852,
210	414904270210R	RES SMD (1206) 27kΩ F,RT ROHS	TA-I,UNIOHM,WALSIN,YAGEO,	3	R853,R854,R855,

220	414908100910R	RES SMD(0805)10Ω F,RT ROHS	TA-I,UNIOHM,WALSIN,YAGEO,	2	R856,R7,
240	414908330110R	RES SMD (0805) 3.3KΩ F,RT RoHS REV:A	TA-I,UNIOHM,WALSIN,YAGEO,	1	R868,
250	414908039250R	RES SMD (0805) 3.9KΩ J,RT RoHS	TA-I,UNIOHM,WALSIN,YAGEO,	1	R872,
270	411023004021R	DIO SN4148-LF 75V/0.15A SMD 1206 (FEC)Ro	FRONTIER,	1	D841,
270	411020046090R	DIO 1N4148W 75V/0.15A(PEC)RoHS SOD-123	PANJIT,	0	
270	411020046310R	DIO 1N4148W-F 75V/0.15A(DIODES RoHS,SOD-	DIODES,	0	
280	411020068020R	DIO BAW56 70V SOT-23(FRONTIER)RoHS	FRONTIER,	1	ZD1,
280	411020068090R	DIO BAW56 75V SOT-23(PANJIT)RoHS	PANJIT,	0	
280	411020068210R	DIO BAW56 85V SOT-23(PHILIPS)RoHS	PHILIPS,	0	
290	411020047020R	DIO BAV70-LF, 70V SOT-23(FEC) ROHS	FRONTIER,	2	ZD2,ZD3,
290	411020047210R	DIO BAV70 85V SOT23 (PHILIPS) RoHS	PHILIPS,	0	
290	411020047090R	DIO BAV70, 70V SOT-23(PEC) ROHS	PANJIT,	0	
300	411131556950R	ZENER 5.6V 0.5W BZT52C5V6-F,SO D123(DIOD	DIODES,	2	ZD4,ZD5,
300	411121456950R	ZENER 5.6V BZT52-C5V6 SOD-123(WILLAS)ROH	WILLAS,	0	
300	411120956950R	ZENER 5.6V 0.41W BZT52-C5V6,SO D123(PANJ	PANJIT,	0	
310	411020026210R	DIO BAV99 350mW 70V SOT-23(PHI RoHS	PHILIPS,	2	ZD6,ZD7,
310	411020026390R	DIO BAV99,SOT-23(INFINEON)RoHS	INFINEON,	0	
310	411020026090R	DIO BAV99 350mW 75V SOT-23(PEC RoHS	PANJIT,	0	
310	411020026020R	DIO BAV99-LF 350mW 70V SOT-23 (FEC)RoHS	FRONTIER,	0	
320	410080003290R	XSTR AP4575GM N&P SO-8(APEC)ROHS	AP,	2	Q6,Q7,
320	410080003430R	XSTR P5506NVG N&P SOP-8(NIKO-SEM)ROHS	NIKO,	0	
330	410070010240R	XSTR MMBT4401 NPN SOT23(FAIRCHILD)RoHS	FAIRCHILD,	1	Q851,
330	410070010420R	XSTR MMBT4401 NPN SOT23(PANJIT)RoHS	PANJIT,	0	
330	410070010210R	XSTR PMBT4401 NPN SOT23(PHILIPS)RoHS	PHILIPS,	0	
340	412000628810R	IC LD7552BPS SOP8（Leadtrend)ROHS	LEADTREND,	1	U850,
350	412000654630R	IC INL833GN SOP16(O2 MICRO)Rohs	O2,	1	U1,
360	791701410600R	PCBA,PWR&INV./B,AI,LE22F4-612 ROHS		1	
370	419312254070R	C SMD(0805) X7R 2.2uF 16V K RoHS	DARFON,MURATA,TDK,WALSIN,YAGEO,	1	C3,
380	511110001100R	SEAL-GLUE,NE8800K,(FUJI)	FUJI,	0.03	
380	511110000700R	HERAEUS SMT-ADHESIVE,PD955PY(TAMURA)	D-TEK,FUHONGSHIJI,TAMURA,	0	

ITEM	P/N	Description	Supplier	Usage	Location
	791701410600R	PCBA,PWR&INV./B,AI,LE22F4-612 ROHS			
10	791701450600R	PCBA,PWR&INV./B,AI/A,LE22F4-612 RoHS		1	
20	791701460600R	PCBA,PWR&INV./B,AI/R,LE22F4-612 RoHS		1	

ITEM	P/N	Description	Supplier	Usage	Location
	791701450600R	PCBA,PWR&INV./B,AI/A,LE22F4-612 RoHS			
10	411032006020R	DIO FR10-10-LF 1000V/1A AT(FRO NTIER)RoH	FRONTIER,	1	D851,
10	411032006040R	DIO FR107 1000V/1A DO-41(MOSPE C)RoHS	MOSPEC,	0	
10	411020053090R	DIO PS1010R 1000V/1A DO-41(PAN JIT)RoHS	PANJIT,	0	
20	411020064090R	DIO ER104 400V/1A DO-41(PANJIT RoHS	PANJIT,	1	D852,
20	411032001020R	DIO SF10-04-LF 400V/1A DO-41(F RONTIER)R	FRONTIER,	0	
40	415212703140R	RES MF 1/8W 270KΩ F,AT,RoHS	QUEENMAO,TZAI YUAN,	1	R871,
50	411131430010R	ZENER 30V GDZ30A DO35(WILLAS)RoHS	WILLAS,	1	ZD880,

50	411130930010R	ZENER 30V GDZ30A DO35(PANJIT)RoHS	PANJIT,	0		
60	430613050100R	FUSE SLOW PICO II 5A/125V U/C,AT,ROHS	LITTELFUSE,	1	F851,	
60	430613050101R	FUSE SLOW 5A/125V U/C,AT,ROHS	WALTER,	0		
70	491571400100H	PCB,P/I ,1/OSP /CEM1/16,LE22F4-612	HSIANGKUO,TAT CHUN,	1		
80	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 7.5MM	HOTRON,YUANYE,	400	J1,J2,J5,J11,J12,J13,J14,J15,	
80	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 7.5MM	HOTRON,YUANYE,	0		
90	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 10MM	HOTRON,YUANYE,	200	J3,J6,J7,J4,	
90	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 10MM	HOTRON,YUANYE,	0		
100	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 15MM	HOTRON,YUANYE,	100	J9,J10,	
100	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 15MM	HOTRON,YUANYE,	0		
110	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 12.5MM	HOTRON,YUANYE,	150	J8,J16,J17,	
110	430405000000R	JMPR ROLL/KG D=0.6mm,AT,RoHS 12.5MM	HOTRON,YUANYE,	0		
130	411020080020R	DIO P6KE170A-LF 600W/100A DO-15(FEC)	FRONTIER,	1	D853,	
130	411020080460R	DIO P6KE170A 600W/100A DO-15（SECOS）	SECOS,	0		
130	411020080090R	DIO P6KE170A 600W/100A DO-15（PANJIT）	PANJIT,	0		
140	415222700140R	RES MF 1/4W 270Ω F,AT,MINI,RoHS	QUEENMAO,TZAI YUAN,	1	R857,	
150	415215101140R	RES MF 1/8W 5.1KΩ F,AT,RoHS	QUEENMAO,TZAI YUAN,	2	R11,R25,	
160	506140005700R	LABEL,BARCODE,BLANK,33x7mm, ROHS,FOR PCB	HENGMINGDA,JIAYINMEI,KAIDA,	1		

ITEM	P/N	Description	Supplier	Usage	Location
	791701460600R	PCBA,PWR&INV./B,AI/R,LE22F4-612 RoHS			
10	430613830290R	FUSE TIME LAG 3.15A/250V,RoHS	BELFUSE,CONQUER,LITTELFUSE,WALTER,	1	F850,
20	420421000530R	CAP SD 10uF/50V M,VT 105℃ 5x11 RoHS	LELON,SAMXON,SU'SCON,TEAPO,	1	C855,
30	420424710231R	CAP SD 470uF/25V M 105℃ VT 10x16 RoHS	LELON,SAMXON,SU'SCON,TEAPO,	3	C856,C857,C858,
40	418268123030R	CAP CD X7R 680pF 500V K VT RoHS	JNC,POE,SUCCESS(SEC),	1	C862,
50	412022002240R	IC KA431AZ 1%,VT (FAIRCHILD) RoHS	FAIRCHILD,	1	I851,
50	412022002830R	IC AS431 TO-92 VT(A1SEMI)RoHS	A1SEMI,	0	
50	412022002550R	IC AME431BAJATB25Z TO-92-3(AME RoHS	AME,	0	
50	412022002440R	IC AZ431BZ-ATRE1 TO-92(BCD) RoHS	BCD,	0	
60	418210233030R	CAP CD X7R 1000pF/1KV K,VT 2X7R102K102K5	JNC,POE,SUCCESS(SEC),	1	C873,

3.PCBA KEYPAD BOM

ITEM	P/N	Revision	Description	Supplier	Usage	Location
	791701500000R		PCBA,KEYPAD BOARD LE22F4-612 ROHS			
10	430602680170R		SW,METAL DOME 180gf 5P ROHS	FOXCONN,HUA-JIE,	1	
20	430631080190R		WFR 8P 1.25MM 180° W/LOCK ROHS	JOWLE,FOXCONN	1	CN101,
30	791711540000R		PCBA,KEYPAD BOARD,SMT LE19E6 ROHS		1	
40	511130002200R	A	SOLDER PASTE,Sn96.5-Ag3.0-Cu0.5 ROHS	TOMAS,	0.08	
40	511130002201R	A	SOLDER PASTE,Sn96.5%Ag3.0%Cu0.5%	TOMAS,	0	
40	511130002202R	A	SOLDER PASTE,Sn95.5%Ag3.9%Cu0.6%	TAMURA,	0	

ITEM	P/N	Revision	Description	Supplier	Usage	Location
	791701540000R		PCBA,KEYPAD BOARD，SMT LE22F4-612 ROHS			
10	411070093500R	A	LED SMD YB KPTB-1612FX151-SZ(Kingbright)	KINGBRIGHT,	1	LED101,

10	411070094500R	A	LED SMD YB HTL-19-22UYUBC/TR8(HongTong)R	HONGTONG,	0	
30	491571500000H		PCB,K/P ,2/ENIG/FR4 /10.LE22F4-612	EXPRESS,WELFARE,	1	

4.Assembly BOM

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		8221F4B1D010R	LE22F4-B12(B)W/O SPK,US(DAO/E2209Wf)				
10		453070800150R	PWR CORD 10A/125V BLK 6FT UL/CSA SVT 3Cx	FOXCONN,I-SHENG,	1	PC	C
20		453010100320R	CABLE D-SUB 15P MALE 6FT BLACK/BLUE AB 8	FOXCONN,GREATLANE,HOTRON,JVE,廣宇,	1	PC	B
30		453030300440R	CABLE DVI-D 18+1P MALE 1.8M BLACK ROHS	FOXCONN,HOTRON,JVE,廣宇,	1	PC	A
40	x	713100005300R	ASSY, PACKAGE, PACK, DAO, LE22F4		1	PC	A
50	x	714070EB0000R	ASSY,FINAL(B)W/O SPK,LE22F4-B12(E2209Wf)		1	PC	A

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		713100005300R	ASSY, PACKAGE, PACK, DAO, LE22F4				A
10		506250022800R	LABEL,ID(LH), LE22F4	HENGMINGDA,高綺,	1	PC	A
20		506250022802R	LABEL,AGENCY, LE22F4	HENGMINGDA,高綺,	1	PC	A
30		506431005200R	FILM,SCREEN,PROTECTION,PRINTED,LE22E0	柏興,鴻旺,	1	PC	A
40		506380001400R	TAPE 3M-897 12x45000mm	久威,矽威,	0.00333	ROL	A
50		506280007601R	POSTER,QUICK SETUP,WEST, LE22F4	裕同,鴻達,	1	PC	A
60		703500005700R	KIT,ACCESSORY, DOC, DAO, LE22F4	裕同,鴻達,	1	PC	A
70		506120300060R	BAG, PLASTIC,L670*W440mm(PRINTED), LE22E	柏興,鴻旺,	1	PC	A
80		506120007000R	BAG PLASTIC L480xW610xT0.05mm(PRINTED)	柏興,鴻旺,	1	PC	A
90		506020025000R	CARTON,DELL(WWW), LE22F4	佳藝,美盈森,	1	PC	A
100		506060010300R	cushion-top,LE22F4	東揚,	1	PC	A
110		506060010310R	cushion-bottom,LE22F4	東揚,	1	PC	A
120		506340004700R	LABEL BLANK 101X50mm DELL EMEA CARTON	高綺,鍵升,	1	PC	A
130		506380002622R	TAPE, WRAPPING TYPE PRINTED(DELL), BLACK	佳普森,	0.00156	ROL	A
140	x	713010000901R	ASSY PACK,40STD,LE22F4		1	PC	A
140	x	713010000900R	ASSY PACK,20STD,LE22F4		0	PC	A
140	x	713010000903R	ASSY PACK,AIR CARGO(20STD),LE22F4		0	PC	A
140	x	713010000904R	ASSY PACK,AIRCARGO(40STD),LE22F4		0	PC	A
140	x	713010000905R	ASSY PACK,AIR CARGO(40H),LE22F4		0	PC	A

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		714070EB0000R	ASSY,FINAL(B)W/O SPK,LE22F4-B12(E2209Wf)				A
10		509212103500R	SCREW,F,CROSS,T.T-2*3,BLK	高億,	4	PC	A
20		509116610510R	SCREW,P,CROSS,M4*10,BLACK-NL(NYLOK)	立侑,高億,	4	PC	A
30		714020014700R	stand-assy,LE22F4	CJC,富鴻齊,	1	PC	A
40		714030018000R	front-bezel-assy,LE22F4	MMP,	1	PC	A
50		714050016900R	back-cover-assy,LE22F4	MMP,	1	PC	A
60	x	714080EB0000R	ASSY,PANEL,W/O SPK,LE22F4-B12(E2209Wf)		1	PC	A

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		713010000900R	ASSY PACK,20STD,LE22F4				A
10		506432003700R	SLIP SHEET,L1192xW898xH75mm, LE22F4	SUNSTREAM,	0	PC	A
20		506037009500R	CARDBOARD,COVER,L1192xW898xH100xT3mm,LE2	佳藝,美盈森,	0	PC	A
30		506039008800R	CORNER PAPER 1060x50x50xT3mm LE1963	佳藝,	0	PC	A
40		506431000300R	FILM,PE 500mmx900M ROHS	三輝,柏興,	0	ROL	A
50		506120400100R	BAG AIR DUNNAGE 2000x1000mmLE1X03 ROHS	SISUN,	0	PC	A
60		506380002612R	TAPE,WRAPPING TYPE,50Mx82mm	佳普森,	0	ROL	A

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		713010000901R	ASSY PACK,40STD,LE22F4				A
10		506432003700R	SLIP SHEET,L1192xW898xH75mm, LE22F4	SUNSTREAM,	0.05	PC	A
20		506037009500R	CARDBOARD,COVER,L1192xW898xH100xT3mm,LE2	佳藝,美盈森,	0.1	PC	A
30		506039008800R	CORNER PAPER 1060x50x50xT3mm LE1963	佳藝,	0.2	PC	A
40		506431000300R	FILM,PE 500mmx900M ROHS	三輝,柏興,	0.00209	ROL	A
50		506120400100R	BAG AIR DUNNAGE 2000x1000mmLE1X03 ROHS	SISUN,	0.00435	PC	A
60		506380002612R	TAPE,WRAPPING TYPE,50Mx82mm	佳普森,	0.00071	ROL	A

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision

		713010000903R	ASSY PACK,AIR CARGO(20STD),LE22F4				A
10		506150006900R	PALLET L1284xW914xH120mm LE1746	實習工廠,	0	PC	B
20		506037009500R	CARDBOARD,COVER,L1192xW898xH100xT3mm,LE2	佳藝,美盈森,	0	PC	A
30		506039005410R	CORNER PAPER 800x50x50xT3mm LE1718	佳藝,	0	PC	A
40		506039001400R	CORNER PAPER 200x50x50mm ROHS	佳藝,金惠,	0	PC	A
50		506431000300R	FILM,PE 500mmx900M ROHS	三輝,柏興,	0	ROL	A
60		506120400100R	BAG AIR DUNNAGE 2000x1000mmLE1X03 ROHS	SISUN,	0	PC	A
70		506380002612R	TAPE,WRAPPING TYPE,50Mx82mm	佳普森,	0	ROL	A

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		713010000904R	ASSY PACK,AIRCARGO(40STD),LE22F4				A
10		506150006900R	PALLET L1284xW914xH120mm LE1746	實習工廠,	0	PC	B
20		506037009500R	CARDBOARD,COVER,L1192xW898xH100xT3mm,LE2	佳藝,美盈森,	0	PC	A
30		506039005410R	CORNER PAPER 800x50x50xT3mm LE1718	佳藝,	0	PC	A
40		506039001400R	CORNER PAPER 200x50x50mm ROHS	佳藝,金惠,	0	PC	A
50		506431000300R	FILM,PE 500mmx900M ROHS	三輝,柏興,	0	ROL	A
60		506120400100R	BAG AIR DUNNAGE 2000x1000mmLE1X03 ROHS	SISUN,	0	PC	A
70		506380002612R	TAPE,WRAPPING TYPE,50Mx82mm	佳普森,	0	ROL	A

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ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		713010000905R	ASSY PACK,AIR CARGO(40H),LE22F4				A
10		506150006900R	PALLET L1284xW914xH120mm LE1746	實習工廠,	0	PC	B
20		506037009500R	CARDBOARD,COVER,L1192xW898xH100xT3mm,LE2	佳藝,美盈森,	0	PC	A
30		506039000101R	CORNER PAPER 1000x50x50xT3mmLE1711	佳藝,金惠,	0	PC	A
40		506039001400R	CORNER PAPER 200x50x50mm ROHS	佳藝,金惠,	0	PC	A
50		506431000300R	FILM,PE 500mmx900M ROHS	三輝,柏興,	0	ROL	A
60		506120400100R	BAG AIR DUNNAGE 2000x1000mmLE1X03 ROHS	SISUN,	0	PC	A
70		506380002612R	TAPE,WRAPPING TYPE,50Mx82mm	佳普森,	0	ROL	A

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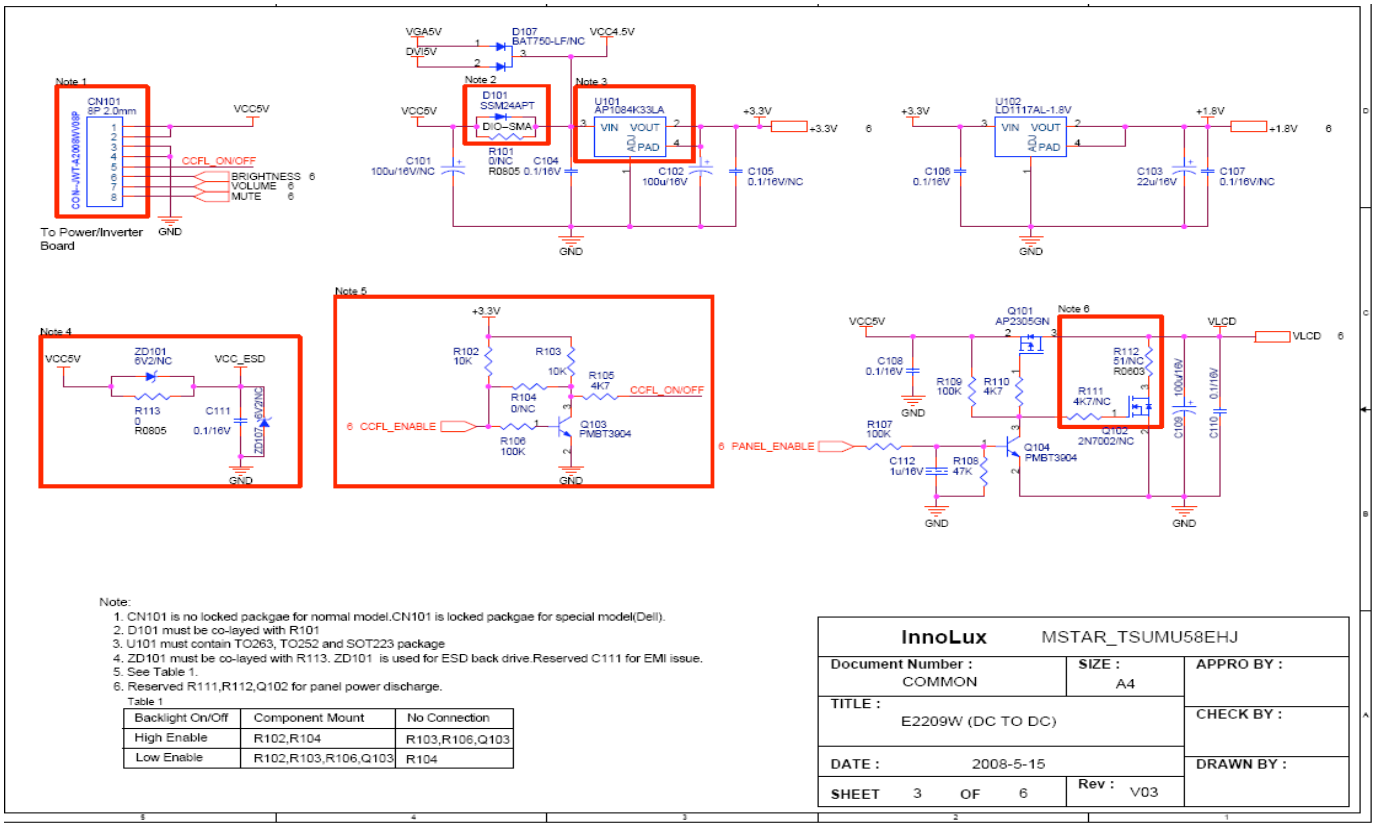
ITEM	Phant.item	P/N	Description	Supplier	Usage	Un	Revision
		714080EB0000R	ASSY,PANEL,W/O SPK,LE22F4-B12(E2209Wf)				A
10		631102220480RD	LCP 22" LTM220M1-L01-CTB(A)(SAMSUNG)ROHS		1	PC	A
10		631102220490RD	LCP 22" LTM220M1-L01-CUB(A)(SAMSUNG)ROHS		0	PC	A
20		701000009400R	ASSY,CHASSIS,V,LE19F6	MMP,	1	PC	A
30		501110200400R	LOGO PLATE DELL UX383 LE1963	DEMETER,	1	PC	A
40		509000001000R	BOLT,#4-40x12.5,Ni ROHS	高億,	4	PC	A
50		509016305200R	SCREW,I,CROSS,M3*5,Zn-Cc	高億,	4	PC	A
60		509016306200R	SCREW,I,CROSS,M3*6,Zn-Cc	高億,	2	PC	A
70		509146306200R	SCREW,P,CROSS,W/WAS,M3*6,Zn-Cc	立侑,高億,	4	PC	A
80		509476606200R	SCREW,B,CROSS W/W(T)M3*8,ZnROHS	高億,鴻益進,	1	PC	A
90		791701300B00R	PCBA,I/F BOARD W/O SPK,LE22F4-B12 ROHS		1	PC	
100		791701400600R	PCBA,P/I BOARD W/O SPK,LE22F4-612 ROHS		1	PC	
110		791701500000R	PCBA,KEYPAD BOARD LE22F4-612 ROHS		1	PC	
120		430303001730R	HRN LVDS FFC 30P 181mm	FOXCONN,P-TWO,	1	PC	A
130		430300801950R	HRN ASSY 2x4P to 8P 405mm UL1571#28	FOXCONN,JVE,	1	PC	

Attachment 2- Schematic

1. Interface board schematic

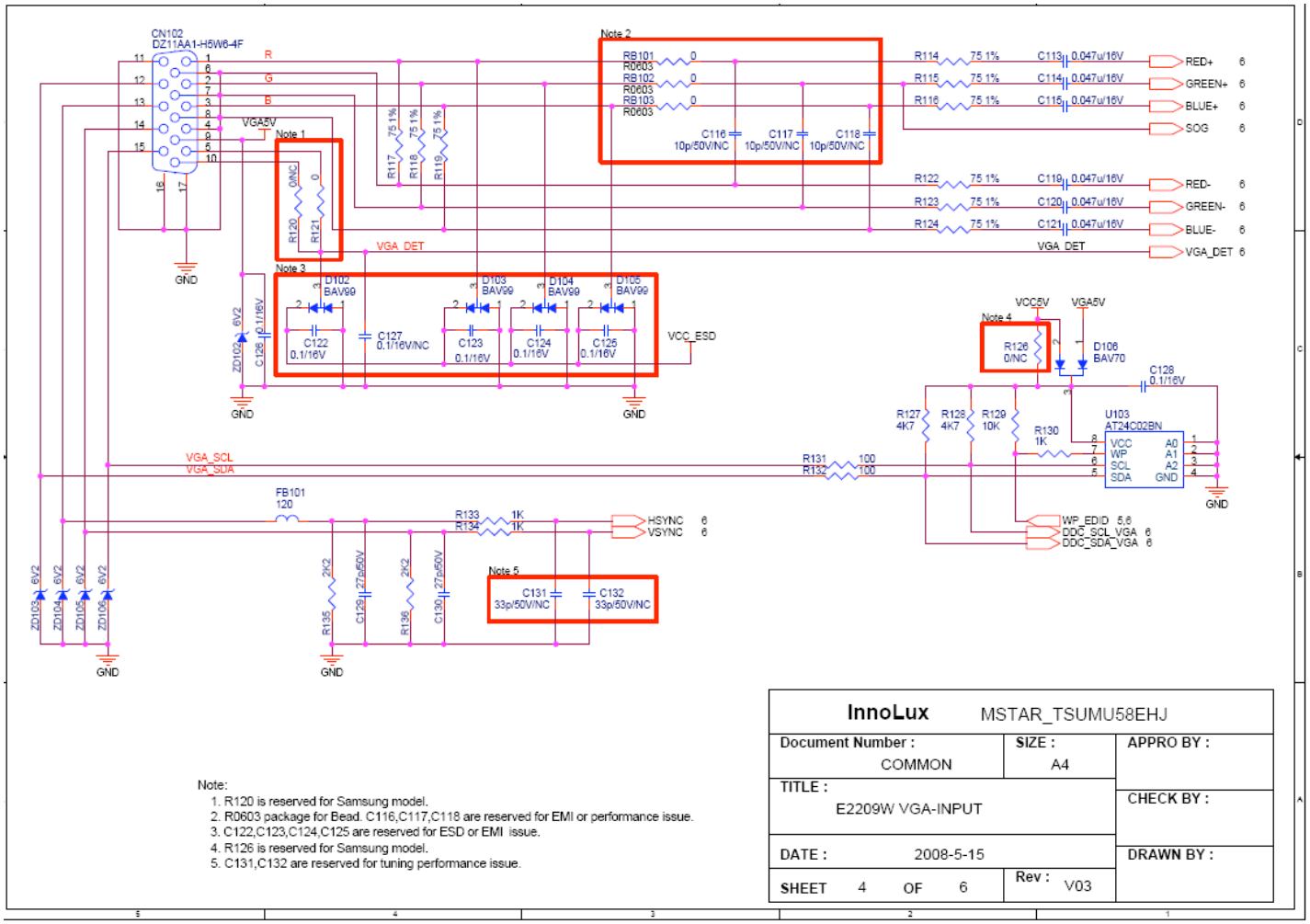


Note:
1. CN101 is no locked packgae for normal model.CN101 is locked packgae for special model(Dell).
2. D101 must be co-layed with R101
3. U101 must contain TO263, TO252 and SOT223 package
4. ZD101 must be co-layed with R113. ZD101 is used for ESD back drive.Reserved C111 for EMI issue.
5. See Table 1.
6. Reserved R111,R112,Q102 for panel power discharge.

Table 1

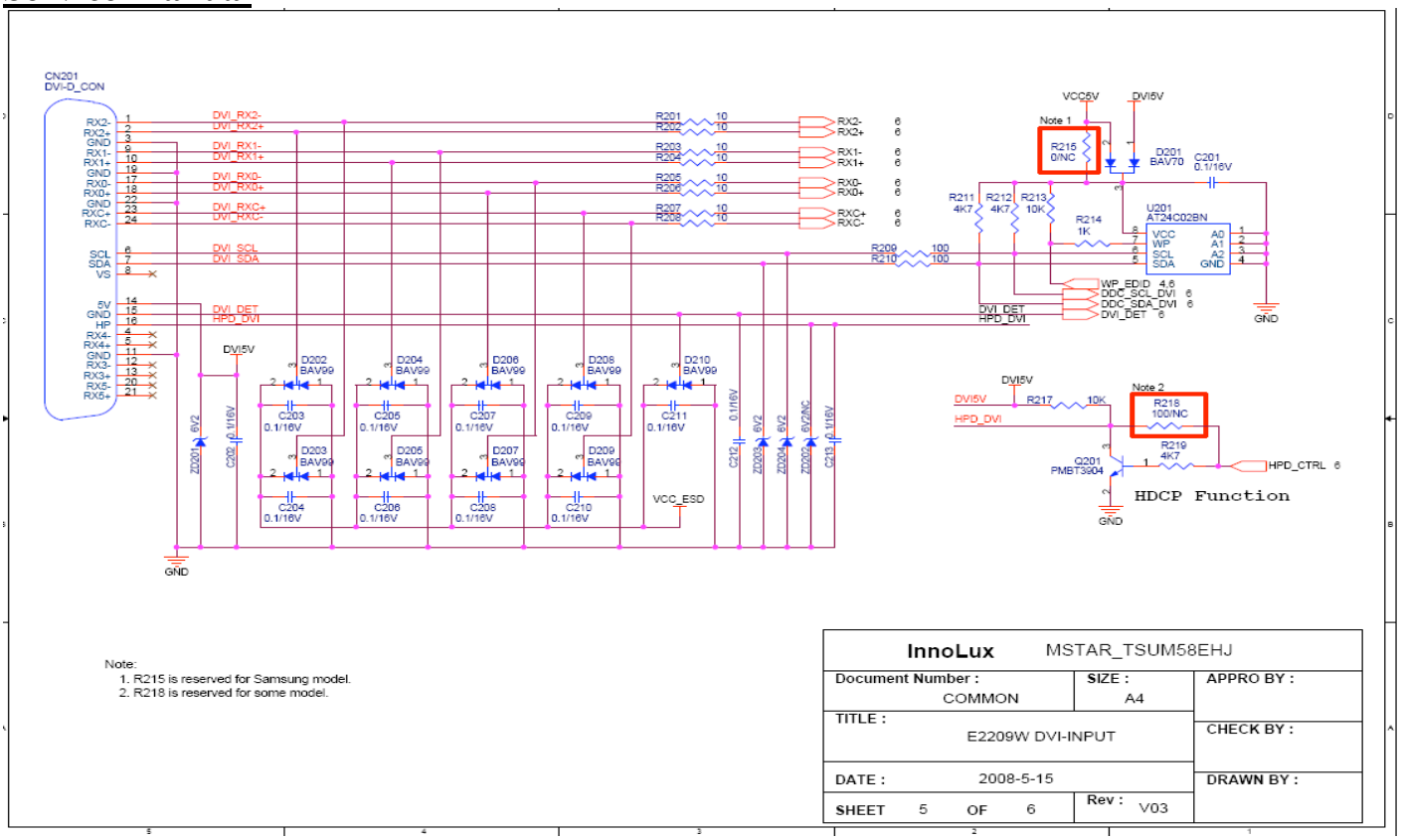
Backlight On/Off	Component Mount	No Connection
High Enable	R102,R104	R103,R106,Q103
Low Enable	R102,R103,R106,Q103	R104

InnoLux	MSTAR_TSUMU58EHJ	
Document Number : COMMON	SIZE : A4	APPRO BY :
TITLE : E2209W (DC TO DC)		CHECK BY :
DATE : 2008-5-15		DRAWN BY :
SHEET 3 OF 6	Rev : V03	



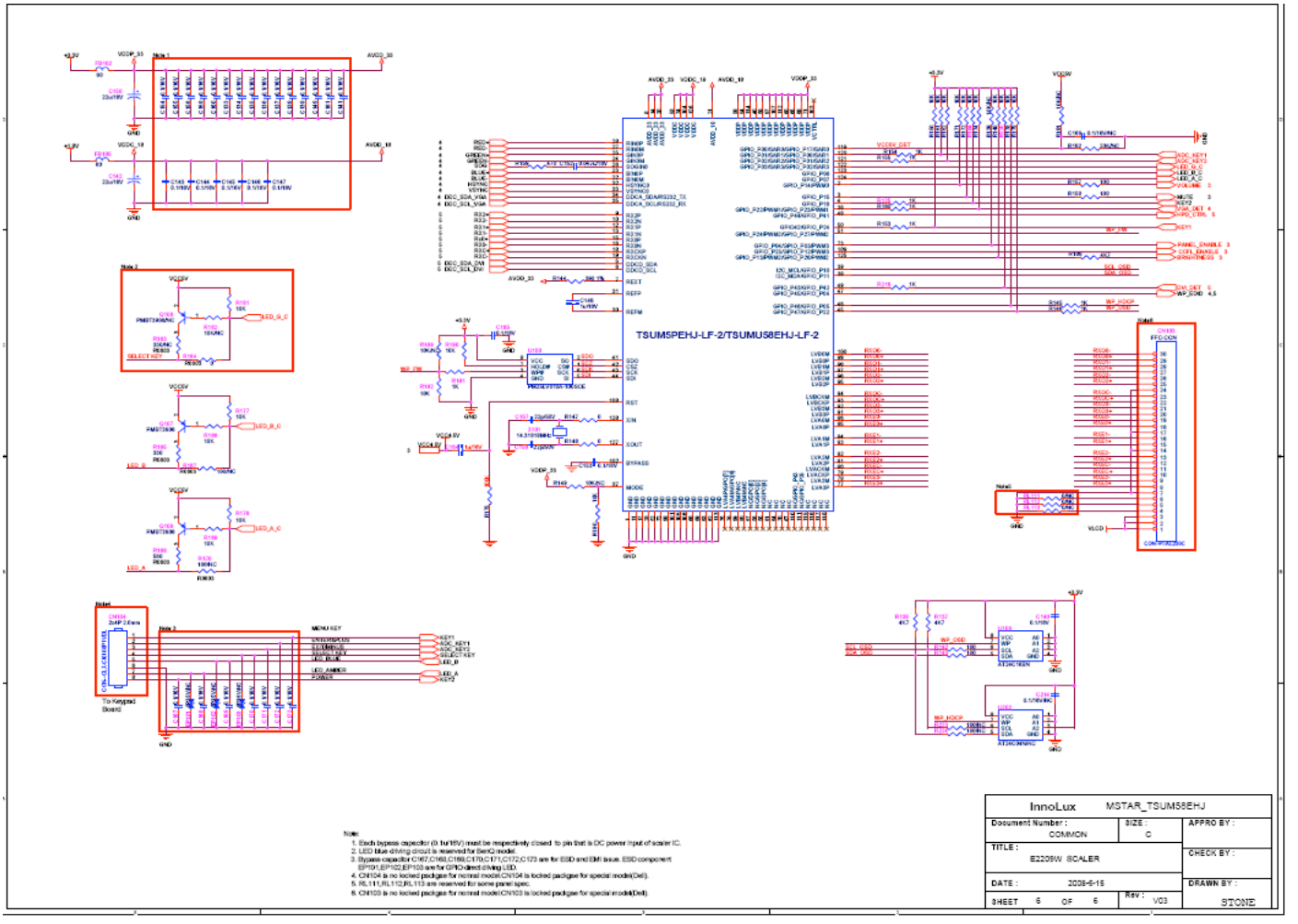
Note:
1. R120 is reserved for Samsung model.
2. R0603 package for Bead. C116,C117,C118 are reserved for EMI or performance issue.
3. C122,C123,C124,C125 are reserved for ESD or EMI issue.
4. R126 is reserved for Samsung model.
5. C131,C132 are reserved for tuning performance issue.

InnoLux	MSTAR_TSUMU58EHJ	
Document Number : COMMON	SIZE : A4	APPRO BY :
TITLE : E2209W VGA-INPUT		CHECK BY :
DATE : 2008-5-15		DRAWN BY :
SHEET 4 OF 6	Rev : V03	



Note:
1. R215 is reserved for Samsung model.
2. R218 is reserved for some model.

InnoLux	MSTAR_TSUM58EHJ		
Document Number : COMMON		SIZE : A4	APPRO BY :
TITLE : E2209W DVI-INPUT			CHECK BY :
DATE : 2008-5-15			DRAWN BY :
SHEET 5 OF 6		Rev : V03	



InnoLux	MSTAR_TSUM58EHJ		
Document Number : COMMON		SIZE : C	APPRO BY :
TITLE : E2209W SCALER			CHECK BY :
DATE : 2008-6-15			DRAWN BY : STONE
SHEET 6 OF 6		Rev : V03	

Note:
1. Each bypass capacitor (0.1uF/16V) must be respectively closed to pin that is DC power input of scaler IC.
2. LED blue driving circuit is reserved for Sen2 model.
3. Bypass capacitor C167,C168,C169,C170,C171,C172,C173 are for ESD and EMI issue. ESD component EP101,EP102,EP103 are for GPIO direct driving LED.
4. CN104 is no locked package for normal model.CN104 is locked package for special model(Dell).
5. RL111,RL112,RL113 are reserved for some panel spec.
6. CN103 is no locked package for normal model.CN103 is locked package for special model(Dell).

2.power board schematic

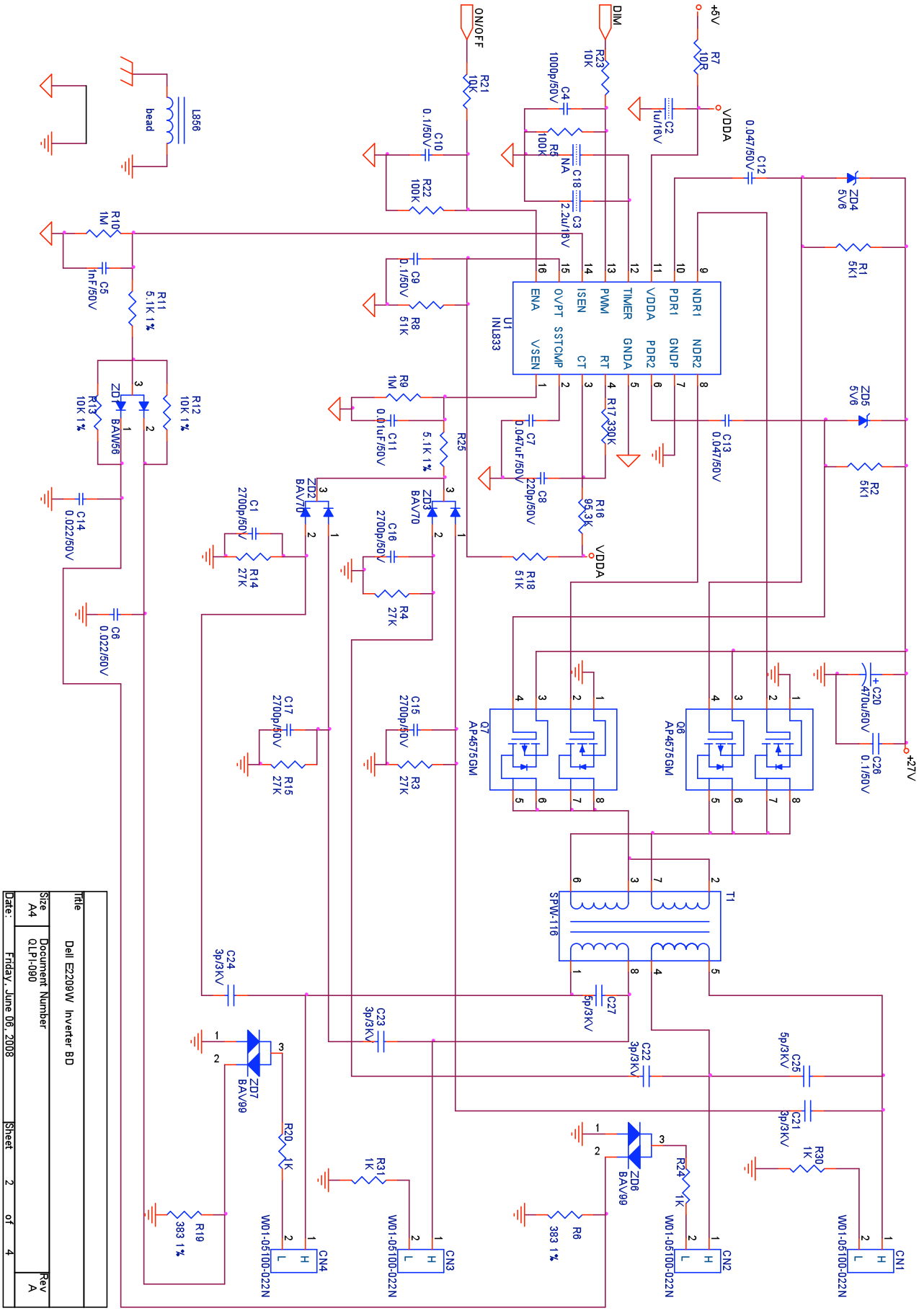
Dell E2209WFPf Power/Inverter Schematic Diagram

SEC/CMO PANEL

SCHEMATIC	SHEET
1.1 Contents	1
1.2 Inverter board INL833	2
1.3 Power board LD7552B	3

Reversion of History
REV1
REV2
REVA for MP

FOXCONN	
Title	1.1 Content for Dell E2209WFPf
Size A4	Document Number Rev 3
Date: Tuesday, May 27, 2008	Sheet 1 of 3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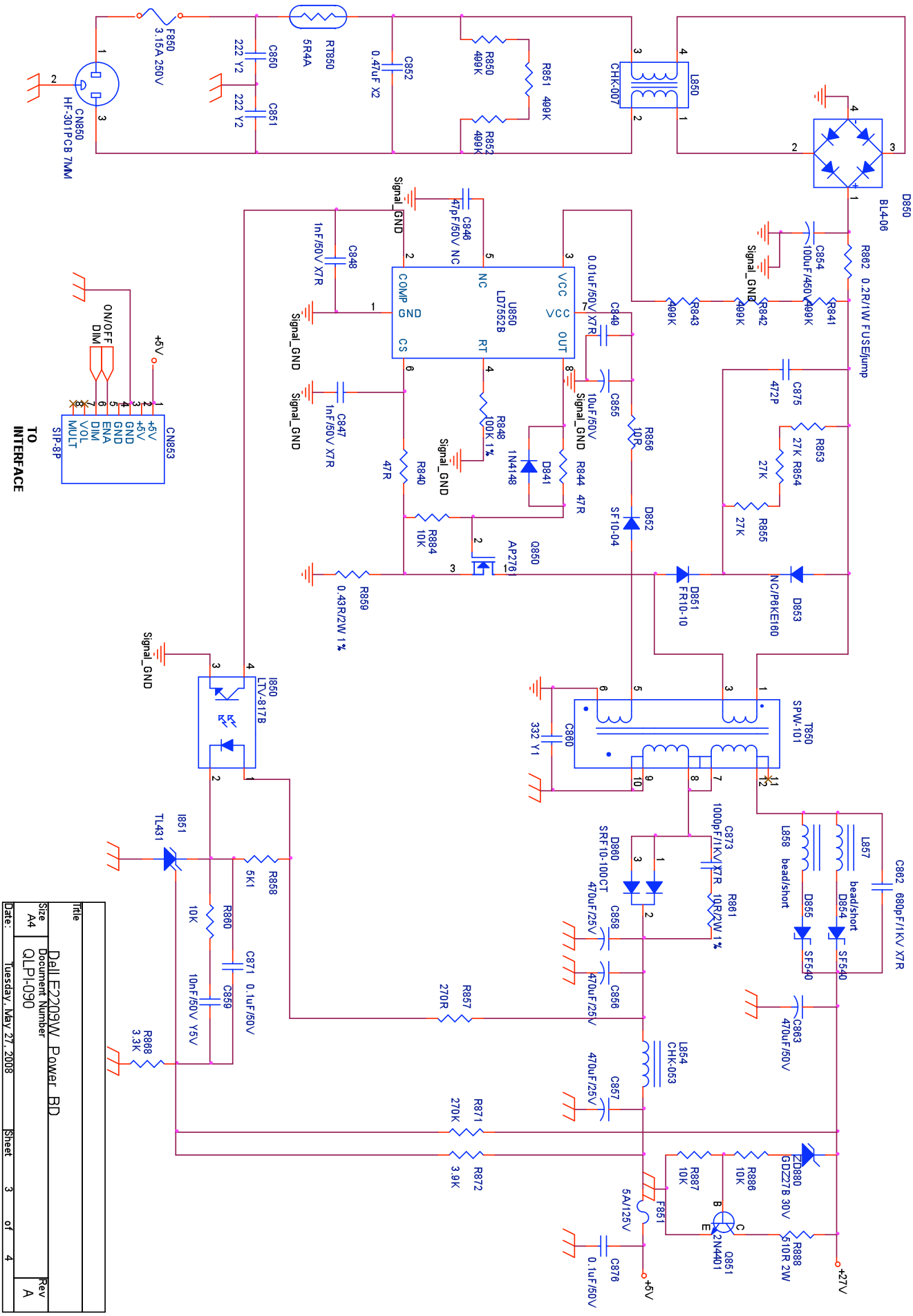
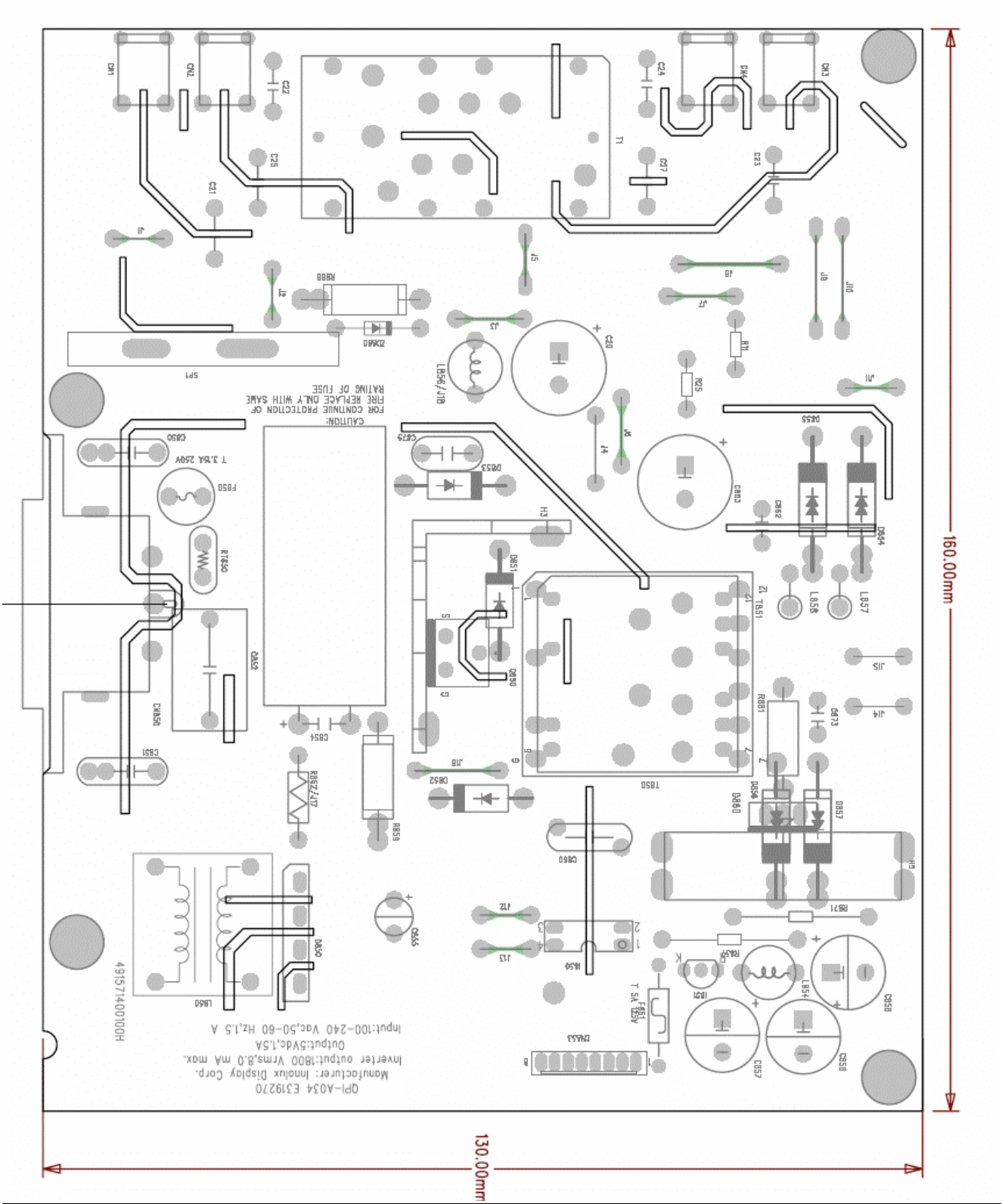
Dell E2209W Inverter BD
Size
A4
Document Number
QLP1-090
Rev
A
Date:
Friday, June 06, 2008
Sheet
2
of
4
U1
INL833
T1
SPW-116
Q6
AP4575GM
Q7
AP4575GM
CN1
CN2
CN3
CN4
W01-05T00-022N
+5V
VDDA
+27V
ON/OFF
DIM
bead
L856


F850 3.15A 250V
CN850 HF-301PCB 7MM
C850 222 Y2
C851 222 Y2
RT850 5R4A
C852 0.47uF X2
R850 499K
R851 499K
R852 499K
CHK-007
L850
D850 BL4-06
C854 100uF/450V
R841 499K
R842 499K
R843 499K
R862 0.2R/1W FUSEJump
C875 472P
R853 27K
R854 27K
R855 27K
C846 47pF/50V NC
C848 1nF/50V X7R
C849 0.01uF/50V X7R
C855 10uF/50V
U850 LD7552B
R856 10R
D852 SF10-04
R844 47R
D841 1N4148
R848 100K 1%
C847 1nF/50V X7R
R840 47R
R884 10K
Q850 AP27G
R859 0.43R/2W 1%
D851 FR10-10
D853 NC/P6KE160
CN853 SIP-8P
ON/OFF
DIM
+5V
TO INTERFACE
I850 LTV-817B
I851 TL431
R858 5K1
R860 10K
C871 0.1uF/50V
C859 10nF/50V Y5V
R888 3.3K
T850 SPW-101
C880 332 Y1
L858 bead/short
L857 bead/short
D864
D855
SF540
C862 680pF/1KV X7R
D860 SRF10-100CT
C873 1000pF/1KV X7R
R861 10R/2W 1%
C858 470uF/25V
C856 470uF/25V
C863 470uF/50V
R857 270R
L854 CHK-053
C857 470uF/25V
R871 270K
R872 3.9K
ZD880 GDZ27B 30V
R887 10K
R886 10K
F851 5A/125V
Q851 2N4401
R888 510R 2W
C876 0.1uF/50V
+27V
+5V
Signal_GND
Title
Size A4
Document Number QLPI-090
Rev A
Date: Tuesday, May 27, 2008
Sheet 3 of 4

Attachment 3- PCB Layout power/inverter bd:

power/inverter board:

Top Layer



Bottom Layer